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DIVISION OF BOTANY AND PLANT PATHOLOGY

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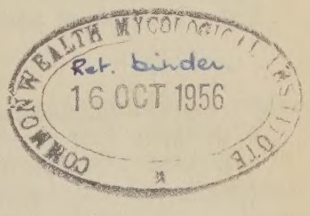
TWENTY-SECOND ANNUAL REPORT OF THE CANADIAN PLANT DISEASE SURVEY 1942



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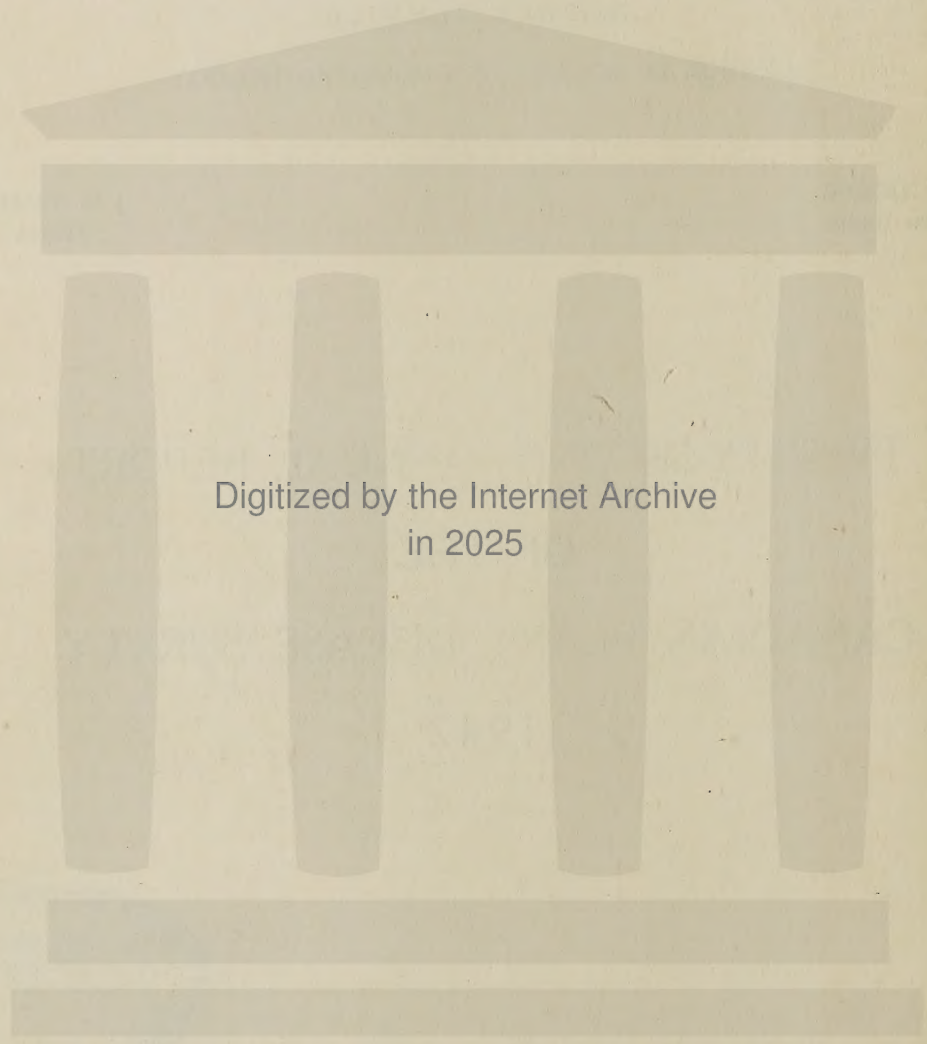

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FOREWORD

This is the Twenty-second Annual Report to be issued and the fourteenth to be compiled since the present writer was placed in charge of the Canadian Plant Disease Survey. Recently Dr. D.B.O. Savile returned to the Division and will assist me in this and other phases of my work. He has compiled the last three sections of the present report covering the Diseases of Fruit Crops, Forest and Shade Trees, and Ornamentals.

The taxonomy of the bacterial plant pathogens has been subject to considerable study in recent years and as a result several genera have been proposed. Originally two genera, Erwinia Winslow et al. and Phytomonas Bergey et al. were erected to accommodate the peritrichic and polar-flagellate species parasitic on plants and these genera were employed in the successive editions of Bergey's Manual. Closer study has revealed that the genus Phytomonas was not a natural unit, but composed of several groups, that differed more from each other than from certain genera of bacteria non-pathogenic to plants. W.H. Burkholder (Phytopath. 29: 128-136. 1939) and M.P. Starr and W.H. Burkholder (Phytopath 32: 598-604. 1942) have given in some detail the reasons for these changes as the result of their own work or that of W.J. Dowson (Zentralbl. f. Bakt. u.s.w. Abt. 2, 100: 177-193. 1939), H.J. Conn (Journ. Bact. 44: 353-360. 1942), H.L. Jensen (Proc. Linn. Soc. N.S.W. 59: 19-61. 1934), and others.

The following genera have been recognized for species formerly placed in Phytomonas: "Xanthomonas Dowson for members of the yellow-pigmented 'Phytomonas campestris group'; Pseudomonas Migula for the green-fluorescent pigment producing and related phytopathogenic bacteria; Agrobacterium Conn for the members of the tumor-forming 'Phytomonas tumefaciens group'; Corynebacterium Lehman & Neumann for certain of the gram-positive forms; Phytomonas Bergey et al. is retained for those phytopathogenic bacteria still of doubtful systematic postion." (M.P. Starr et al. Phytopath. 33: 314-318. 1943). The editors of the "Review of Applied Mycology" have adopted essentially the same position, for they have followed Dowson in his use of Pseudomonas, Xanthomonas, and Corynebacterium. The genus Erwinia is also being retained in the Survey for phytopathogenic bacteria with peritrichic flagella. Since many of the species have been transferred to the new genera quite informally without even indicating in some instances the original author, the names of the bacterial plant pathogens in this report, other than those in Erwinia, have been carefully checked and what is believed to be the correct citation has been given for each.

In the Basidiomycetes, the name Pellicularia filamentosa (Pat.) Rogers has been adopted for the familiar Corticium Solani. This seemed advisable as the segregation of this ubiquitous parasite and related species into a separate genus has long been foreshadowed. Roger's treatment should stimulate research on the cultural characters of the group, which in turn should lead to a better understanding of isolations of Rhizoctonia particularly of the Solani type.

Since the last report was issued, there has appeared the "Check List of Diseases of Economic Plants in Canada" prepared by Ivan H. Crowell and E. Lavallee. It is closely patterned after the "Check List of Diseases of Economic Plants in the United States" prepared by P.J. Anderson et al.

(U.S.D.A. Dept. Bull. 1366. 1926) and the "Check List Revision" by Freeman Weiss presently being issued in the U.S.D.A. Pl. Dis. Reporter. The Canadian List contains one valuable new feature, the common names of the plants and their diseases in French.

Attention was directed last year to the opinion expressed by many pathologists that special consideration be given to "the survey of those crops whose acreage has been increasing in recent years, such as sugar beets, soy beans, flax, grasses and field peas, and root crops being grown for seed". On their own initiative, the following have prepared special reports: Prof. T.C. Vanterpool: "Flax Diseases in Saskatchewan in 1942", Dr. A.A. Hildebrand: "Diseases on Sugar Beets in Southwestern Ontario in 1942" and Dr. L.W. Koch, his usual report on Tobacco diseases in Ontario and Que. Besides, he and Dr. Hildebrand provided full notes on the diseases of soy beans in Essex Co., Ont.

Observations by the Dominion Laboratories in the three Prairie Provinces have long been summarized before submission. In Alta., these observations include those made by Dr. A.W. Henry and his associates. It has been customary to ascribe a note to a single person, when it was of unusual interest and particularly the work of one person. However, readers of the Survey apparently experienced difficulty in knowing where one note ended and another began when only some were signed. The compilers at these Laboratories are Dr. M.W. Cormack for Alta., Dr. H.W. Mead for Sask., and Dr. W.L. Gordon for Man. In the future, their names will follow not only their own contributions, but also those compiled by them, except items attributed to a co-worker.

A valued new contributor is Dr. A.D. Baker, in charge of nematode investigations, Division of Entomology, Ottawa. His notes on nematodes should prove of interest to plant pathologists. Mr. C.B. Kelly, Horticultural Station, Vineland Station, Ont., is another.

My thanks are due to all who have contributed so generously to the Survey. Special mention may be made of Dr. J. Emile Jacques, Mr. Omer Caron and Mr. David Leblond, Prof. J.E. Howitt and Dr. J.D. MacLachlan, and the District Potato Inspectors and Dr. R.O. Lachance for translating "New and Noteworthy Diseases".

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May 11, 1943
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New or Noteworthy Diseases

Stem rust (Puccinia graminis) caused almost no damage to wheat in Canada in 1942. It developed very late in the season and only traces were found on susceptible varieties at maturity in Man. Somewhat heavier infections were present in Sask. and Alta.

Leaf rust (Puccinia triticina) was fairly prevalent on Red Bobs, a variety susceptible to leaf and stem rusts, and on the stem-rust resistant Thatcher and Apex, while Regent and Renown, which are also resistant to leaf rust, bore only light infections. Crown rust (Puccinia coronata) of oats and leaf rust (P. anomala) of barley were more prevalent than usual in the Prairie Provinces. The increase of barley leaf rust in Man. was ascribed in part to the increased acreage of Plush, a variety very susceptible to leaf rust. Additional evidence was obtained in N.B. that local epidemics of crown rust and stem rust on oats are due to plantings of the alternate hosts.

The oat nematode (Heterodera avenae) was first observed in Simcoe Co., Ont. in 1933 and was definitely identified in 1934 in Simcoe and Ontario Counties as the result of studies by Dr. D.F. Putnam (P.D.S. 14: 12-13). Its presence in Waterloo Co. was substantiated by him in 1936 (P.D.S. 16: 9-10). In 1937, it was reported to be rather widely distributed in Ont. by M.J. Laughland, but the nematodes were not positively identified (P.D.S. 17: 10-11). Studies conducted by Dr. A.D. Baker in the past two years indicate that although more infested fields have been found in the areas originally indicated by Putnam, there is no evidence of the nematode being diffused over widely scattered counties in the province. The occurrence of the meadow nematode (Pratylenchus pratensis) on oats is reported to the Survey for the first time.

Although browning root rot (Pythium spp.) caused very severe lesioning of the roots of cereals, growing conditions were so favourable that recovery was general and yields moderate. However, severe root necrosis did delay ripening and increased the possibilities of frost damage. Isolations from field material indicate that both fox-tail millet (Setaria italica) and broomcorn millet (Panicum miliaceum)may suffer considerable damage from browning root rot.

That leaf blotch (Helminthosporium avenae) may at times be an important seedling blight in Canada is indicated by the high incidence of the organism in the seed, the relatively severe leaf infections observed in the field when heavily infected seed is sown, and by the presence of seedling blight under cool greenhouse conditions. Primary infection in net blotch (H. teres) and spot blotch (H. sativum) may also be largely from infected seed.

Covered smut (U. Hordei)and black (loose) smut (U. medians or U. nigra) were prevalent in Plush barley in Man. destroying 40-50% of the heads in some fields. Tapke has reported recently that half the samples of loose smut collected in the United States and studied by him were affected by U. nigra rather than U. nuda. The same situation may also hold in Canada.

Bacterial wilt (Corynebacterium insidiosum) continues to be destructive to alfalfa in the irrigated districts of southern Alta. It was present in all stands three years old or older and in an occasional two-year-old

stand. Crown rot, due to a low-temperature basidiomycete, caused early-spring killing of alfalfa in the principal alfalfa-growing areas in Alta. particularly in the seed-growing districts of northern and central Alta. The disease along with true winter-killing did considerable damage in the seed-growing areas of northeastern Sask. Witches' broom (virus) was reported shortening the life of alfalfa stands in the Nicola and Cariboo Valleys, B.C.; this is the first definite indication of its economic importance in Canada.

Diseases of flax attracted much attention in Canada due to their unusual prevalence and their greater importance as the result of the increased acreage. Rust (Melampsora Lini)was general and reached epidemic proportions in some fields in the Prairies. It was most severe on Bison, probably the most commonly grown variety. Redwing is fairly susceptible, but is favoured in northerly sections on account of its earliness. Royal appears to be quite resistant. Field observations indicate that rust was worse when a field was located close to those in flax the previous year or where bits of rusted straw were present in the seed with which it was sown. Other flax diseases to which attention may be directed are browning and stem break (Polyspora Lini) and anthracnose (Colletotrichum Lini).

Kok-saghyz, or Russian dandelion, was grown for the first time in Canada in 1942. A bacterial leaf spot caused by a possibly new species of Xanthomonas was found in Man. A rust (Puccinia Carthami) was found on the little-cultivated safflower at Morden, Man. and Saskatoon, Sask.

Pod and stem blight (Diaporthe Phaseolorum var. Sojae)is the most important disease affecting soybeans in Essex Co., Ont., according to Drs. Koch and Hildebrand, because of its widespread occurrence and destructiveness. Both the blight and anthracnose (Colletotrichum Glycines) are diseases new to Canada. Of the sugar-beet diseases in southwestern Ont. mention may be made of seed-head injury (Phoma Betae), Rhizoctonia rot (R. Solani), Rhizopus rot (R. arrhizus), black root or damping off (cause undetermined), and the sugar beet nematode (Heterodera schachtii)

Among the vegetable diseases, bacterial blight (Xanthomonas phaseoli) and halo blight (Pseudomonas medicaginis var. phaseolicola), especially the latter, were prevalent on beans in Canada and were particularly destructive in southern Alta. Yellows (aster yellows virus) continues to be destructive in carrots in the Maritime Provinces. A yellows, believed to be due to beet curly-top virus, was reported on carrot from the Okanagan Valley, B.C. Mosaic (virus) is a disease of great economic importance in both field and greenhouse crops of cucumbers in Ont. Two diseases new to the Okanagan Valley, B.C. were downy mildew (Peronospora Schleideniana), which destroyed about half the onion crop and anthracnose (Marssonina Panattoniana) on lettuce. A bacterial stalk rot (?Phytomonas dissolvens) was quite prevalent on some hybrid lines of corn at Vineland Station, Ont. The leaf spots (Phoma Betae and Ramularia Betae) were found for the first time on swiss chard in Canada. A serious outbreak of Phytophthora stem rot (P. parasitica) was found on tomato at Ottawa. Both early blight (Alternaria Solani) and Septoria leaf spot (S. Lycopersici) were destructive to field tomatoes in the Niagara Peninsula, Ont. While potato X virus has been identified as one of the components causing streak in tomatoes in mixed virus infections, this virus was found alone for the first time in Ont. in tomatoes, in which it caused an indistinct vein-banding.

Bacterial ring rot (Corynebacterium sepedonicum) of potato affected approximately half the commercial acreage in southern Alta. in 1942. Previously it was almost wholly confined to the large irrigated district centering on Lethbridge, but this year it was found at Brooks and Rosemary in the Eastern Irrigation District. Ring rot was observed for the first time in B.C. and was also present in certified stock in the other provinces except N.S. For the second year only a single case has been found in P.E.I. The disease apparently is being brought under control in certified seed in N.B., but continues to be prevalent in Que. due to a disregard of sanitary measures. The amount in certified seed in the other provinces is negligible. To curtail still further the possible contamination of healthy stocks of certified seed, the table stock of each grower is inspected as well and if bacterial ring rot is found in any field on his farm no seed stocks are certified from that farm. The amount of ring rot in table stock is not precisely known, but affected stock is believed to be a source of great danger in provinces where the disease is not established. For example, bacterial ring rot was found this year at Vancouver, B.C. in carload shipments from Alta., Sask., and Man.

Late blight (Phytophthora infestans) caused a noticeable reduction of yield in B.C. and N.B. due to an early-season attack, while it caused severe losses as a tuber rot in Man., in the Rainy River District and the eastern counties of Ont., with a somewhat lighter toll in western Que. and P.E.I.

No additional cases of wart (Synchytrium endobioticum) were found in N.S., although a careful survey of plantings of "English" potatoes was made. Leaf roll (virus) caused the rejection of more fields entered for certification than mosaic in most provinces. While it was less prevalent in N.B. than in 1941, there was a big increase in P.E.I. It was also destructive in Que., particularly in Nicolet Co.

Purple top (?virus) of potato was unusually prevalent in the Maritime Provinces in 1942, where it has been observed more or less frequently since 1939. D.J. MacLeod (P.D.S. 19:74) has given a description of the trouble as it occurs in N.B. Observers are emphatic that more and more plants become affected as the season advances. This condition seems to be especially common in Katahdin, on which it was first noted, while few plants of Green Mountain are affected. The possibility that purple top of potato may be due to the aster yellows virus, particularly the strain on carrots, is reviewed. (p. 61)

The Wisconsin leaf spot (Pseudomonas mellea) of tobacco was recognized for the first time in Canada when it occurred in epidemic form in Que. Mosaic of tobacco in Ont. and Que. is apparently due, in part, to the tobacco mosaic virus and, in part, to the cucumber mosaic virus. The latter appears to be more prevalent than the former in Que., where pipe and cigar-leaf tobacco is grown in comparatively small plots. Cucumber mosaic is spread by insects from overwintering perennial hosts. Rhizopus Oryzae caused some loss in flue-cured tobacco in Ont.

Fire blight (Erwinia amylovora) is quickly becoming established on apple in Alta., where it was reported for the first time in 1941.

Although perennial canker (Neofabraea perennans) is prevalent in the Okanagan valley, B.C., losses have been greatly reduced since the introduction of the woolly aphid parasite, Aphelinus mali. Scab (Venturia inaequalis) caused heavy losses in the interior of B.C., where it is usually of little importance and can be controlled by a relatively limited spray schedule. The disease was also unusually severe in southern Ont. due to continued rain. Elsewhere scab control presented no special difficulty. Bitter pit (non-parasitic) was general this year in N.B. and N.S. and affected up to 50% of the fruit on individual trees.

Isolations made by W. Jones indicate that most of the blossom and twig blight in cherry and plum in the coastal region of B.C. is due to Sclerotinia laxa, although S. fructicola occurs. A similar study is needed on fruit affected by brown rot. Brown rot caused considerable loss to the peach crop in southern Ont. as a result of the moist season. Bacterial blight (Xanthomonas pruni) was of considerable importance in peach orchards in Lincoln Co., Ont., particularly in those adjacent to Lake Ontario. Western X disease (virus) of peach has increased in the southern Okanagan, B.C., since the orchards were first surveyed in 1940. Affected trees are often difficult to detect. Although X disease (virus) was only found in the Niagara Peninsula, Ont. in 1941, the disease was probably present there several years earlier. Evidence has been collected that the chokecherry is not essential to the spread of X disease, but that it may spread directly from peach to peach over considerable distances. X disease has also been found severely affecting chokecherries near Brighton and Port Hope, many miles east of Toronto.

Shot hole (Cercospora circumcissa) was severe on plums and Sioux sandcherry at Brandon, Man.; although this fungus has not previously been reported in the Survey, it is represented in the Herbarium by specimens on P. virginiana from Gaspe, Que., and on P. serotina and P. virginiana from Ont.

Among the tree diseases mention may be made of: Labrella leaf spot (L. Coryli) on Corylus rostrata in B.C.; brown mould (Gonatorrhodiella Highlei) associated with Nectria canker on beech in N.B. and N.S.; canker and die back (Fusarium lateritium var. Mori) on mulberry from B.C.; leaf blight (Rhabdogloeum Pseudotsugae) associated with Rhabdocline on Douglas fir in B.C.

Interesting new records of diseases of ornamentals are: bacterial blight (Xanthomonas incanae) on stocks in greenhouses at Dundas and Toronto, Ont.; anthracnose (Sphaceloma Rosarum) on rose in B.C. and Man., previously listed on phanerogamic specimens from Que. and N.B. by Dr. Anna E. Jenkins; stem rot (Sclerotinia sclerotiorum) on tulip in B.C.; and rust (Endophyllum Sempervivi) on Sempervivum spp. near Grimsby, Ont., but reported previously from B.C.

The Weather and Its Influence on Plant Diseases

The influence of weather on the disease situation was particularly well exemplified by the observations made in the Prairie Provinces in 1942. In general, the weather was exceptionally cool and wet throughout the growing season in contrast to the hot and dry weather particularly of the drought years. Most diseases were more prevalent, as for instance ergot (Claviceps purpurea) on wheat and barley, take all (Ophiobolus graminis) on wheat, the leaf rusts of wheat, oats, and barley (Puccinia triticina, P. coronata and P. anomala. The leaf rusts were unusually prevalent due to the cool weather. In fact, it was so cool for a time, particularly in Alberta, that their development was definitely retarded, until warmer weather came. Septoria nodorum was epidemic on the leaves and heads of wheat in Southern Man. and southeastern Sask. recalling the epidemic of 1923. Rhizoctonia (Pellicularia filamentosa) was unusually severe on potatoes in the field, while sclerotium formation on the tubers was insignificant, a situation encountered quite regularly in the Maritime Provinces. The presence of late blight (Phytophthora infestans) in Man. for the second year is a sure indication of the wetness of the season. Some of these observations will be further elaborated in the individual reports of the respective provinces.

The weather in the coastal areas of B.C. was characterized by a mild winter and dry and moist periods alternating so that January and February were dry, late spring and early summer moist and late summer and fall dry.

The mild winter was favourable to the early appearance of foliage diseases, e.g. scald (Rhynchosporium Secalis) of fall barley, tulip fire (Botrytis Tulipae), leaf spots of grasses and downy mildew (Pseudoperonospora Humuli) of hops. During the moist late spring and early summer, late blight of potatoes and downy mildew of hops became epidemic in some fields and yards. Much damage was also suffered by strawberry fruit owing to unfavourable harvesting weather during this period. Diseases such as late blight of potatoes and downy mildew of hops were materially checked during the dry late summer and fall, and the weather was satisfactory for the harvesting of all fall crops. (W. Jones)

The unusual number of parasitic diseases and their destructiveness in the interior of B.C. in the past two years has been no doubt due to the weather conditions in those seasons. The differences are well illustrated by the rainfall. At Salmon Arm the average monthly rainfall from April to September is 1.28 in. and at Summerland 0.81 in. At Salmon Arm the average monthly rainfall from May to September 1941 and from May to Aug. 1942 was 2.64 in. and at Summerland from April to Sept. 1941 and from April to July 1942 was 1.94 in. This average is over double the long-time average for these months. The occurrence of late blight of potato and downy mildew of onion in the Okanagan indicate how quickly these diseases will penetrate an area just as soon as weather conditions permit. Their sudden appearance over such wide areas would seem to require their presence in the Okanagan every year, but at such a low level of incidence as to pass unnoticed. (H.R. McLarty)

In Alberta, a scanty snow cover during the latter part of the winter was apparently responsible for the severe winter-killing of winter wheat and clovers which occurred in the northern areas. Despite dry conditions at the start, the season became unusually wet in nearly all parts of the province

except the Peace River district. As a result, crop growth was exceptionally heavy and late-maturing, and there was considerable damage from lodging and frost. The abundant rainfall and the heavy dews at night produced moisture conditions apparently ideal for the development of stem, foliage, and head diseases, but, with few exceptions, they were not unusually prevalent. Notable among these exceptions were the Septoria leaf diseases, ergot, and the bacterial blights of beans. The stem and leaf rusts of cereals developed at an alarming rate in early August but were checked by the extremely cool, wet weather which prevailed during the latter part of the season. In the late fall, wet weather further delayed harvesting and much grain still remained unthreshed with the onset of winter. (M.W. Cormack)

In Saskatchewan, the weather was cool and rainfall was lighter than usual. Seed germinated slowly in early May and some damage was caused to coarse grains and flax by frost. The soil temperature during the latter part of May and early June at Saskatoon was much higher than the long-time average. Reports from the alfalfa growing area of north-central Saskatchewan indicated severe damage to alfalfa by crown rot and winter killing. Heavy to light rains fell during June and July in most areas, and growing conditions were excellent. However, in the south-west and south-central areas, the rainfall was light and moisture reserves soon became depleted by the heavy crop. The showery weather and heavy dews were favorable to development of the leaf rusts of cereals and rust of flax. A notable feature was the absence of stem rust of cereals. High winds and heavy rains caused severe lodging in heavy crops. The weather during August was cool and showery, and very unfavourable for ripening. Wheat, particularly ripened slowly; and many troubles appeared in the form of head, leaf and stem discolorations, in part due to bacteria, but much of a physiological nature. An outstanding feature of this season was a severe outbreak of common rootrot (Helminthosporium and Fusarium) of wheat in south-western Saskatchewan centering around Cadillac. It is considered that this was brought about by wet weather in this area following a dry spell in July. In general, the wet, cool weather of the latter part of the growing season favoured the development of diseases which have not appeared for many years: namely black chaff of wheat, bacterial blight of barley, and common rootrot of wheat in epidemic form. (H.W. Mead)

Precipitation throughout most of Man. was somewhat above normal during April and May and these satisfactory moisture conditions, combined with favourable temperatures averaging from 1 to 2 degrees above normal, favoured the growth of all field crops and heavy stands of grain were general throughout the whole of the province. Moisture conditions, owing to frequent timely rains, remained favourable for the entire growing season and many districts received rainfall totalling more than 25% above normal. From June 15 to July 6 temperatures throughout the whole of Man. ranged from 4 to 9 degrees below normal. From then on to the end of the season temperatures ranged from 1 to 2 degrees below normal.

The favourable moisture conditions which prevailed over the entire season afforded very favourable conditions for the germination of the spores of rusts and other fungi. However, the abnormally low temperatures which prevailed during the latter part of June and early July retarded the development of cereal rusts, particularly stem rust, a rust which develops best at high temperatures. This rust developed very slowly, in fact only very slight traces of stem rust developed on suceptible wheat and barley varieties. It was not until after the barley crop was harvested, in mid August, that stem rust became general on wild barley,

Hordeum jubatum, a grass which grows abundantly along roadsides and in many hay pastures throughout Manitoba. The virtual absence of stem rust from Man. during the earlier part of the season was, no doubt, in part due to the unfavourable temperature conditions which prevailed during the very period that this rust usually gets established in this area. However, it should be borne in mind that perhaps the most important factor retarding the progress of stem rust in the spring wheat area, these last few years, is the large acreage of rust resistant wheat varieties now grown in this area, which very materially limits the availability of suitable host plants for this rust.

Leaf rust of wheat apparently was also somewhat checked by adverse temperatures during late June and early July. This rust, however, tolerates cool conditions better than stem rust and it developed more abundantly and when the temperatures became favourable for its development, during most of July and early August, it developed rapidly and infections of this rust became very general and severe, averaging over 80 per cent on Thatcher wheat by harvest time. However, this heavy rust infection did not seem to reduce the yield of Thatcher greatly except in late crops which were naturally subjected to the action of the rust for a longer period than the main crop. The failure of this heavy leaf rust infection to cause very appreciable reduction in yield, bushel weight, and grade of Thatcher was due to the fact that this rust, owing to the retarding effect of unfavourable low temperatures during the early part of the season, did not get established on the crops until they had advanced far enough towards maturity to escape to a considerable degree the damaging effect of the rust.

Leaf rust of barley, a rust which develops best under relatively cool conditions, was more abundant in Man. this year than for some time past. A light infection of this rust was general throughout the province. In seasons when above normal temperatures prevail in Man. leaf rust of barley occurs only sparsely or not at all.

Crown rust of oats was affected by the low temperatures of late June and early July in much the same manner as leaf rust of wheat. Namely, its progress was slowed down, and, although heavy infections of this rust developed in many fields before the end of the season, much of the crop had advanced so far towards maturity before rust infections became heavy that they escaped appreciable damage. (B. Peturson)

In the Niagara peninsula, Ont., the weather during the growing season of 1942 was distinctly favourable for fungous diseases. The season opened early, the fair warm weather of late April favoured rapid development and many sweet cherry and peach trees were in bloom on April 30. In May, the weather was wet with fifteen periods of precipitation with the abnormal total of 5.33 in. of rain. It was almost continuously wet May 15-24 during which time scab ascospore discharge was very active, resulting in heavy primary infection apparent on May 25. This infection period was closely followed by a second from May 30 to June 4, a six-day period of high relative humidity decidedly favourable for spread of apple scab and abundant fruiting of lesions.

Leaf spot (Higginsia hiemalis) of sour cherries was very prevalent on June 11 and no doubt much of the infection occurred during the middle of May when ascospore discharge was at a peak. With cool, damp weather prevailing in June, very little shot-holing developed and abundant fruiting of the fungus was evident. A second outbreak of leaf spot followed the infection period of July 17-20, four days of heavy rain totalling 3.0 in. At this time also considerable damage to sour cherries occurred in the form of scald directly a result of the 2.0 inch rainfall early on July 18, which was followed immediately by a few hours of extremely warm weather. Damaged fruit quickly developed brown rot during the damp weather which followed. On August 8-11, another infection period occurred this time after spraying operations had been completed; some late scab developed on the fruit, and leaf spot became important in many orchards previously very free from infection. The wet weather in May also favoured brown rot infection particularly of the blossom parts of sour cherries and peaches. In some cherry orchards, 10-20% of the newly formed green fruit was affected. With peaches, the fungus progressed from blighted blossom parts into the twigs and caused their girdling and death.

The heavy rainfall of May was a factor in the outbreak of Verticillium Wilt found in several areas. Excess moisture is known to be a factor in the development of this disease.

The heavy precipitation and the consequent increase in lake fogs experienced in peach orchards bordering Lake Ontario was a factor in the prevalence of bacterial spot (Xanthomonas pruni) found in these orchards.

Brown rot of peaches caused much loss on the early Rochester variety and again on the late Elberta. A four-day rainy spell, August 8-11, with high humidity and temperatures, was responsible for the outbreak of brown rot on the Rochester variety which provided a tremendous build-up of infection for the later crop. However, the harvest period for the mid-season varieties was fair and it was not until the end of August and early September when the weather was warm, damp and muggy that brown rot infection was again favoured. Much of the loss was occasioned in the distant car-lot shipments when a high percentage of the fruit was found at destination to be unmarketable due to brown rot and other fruit decays such as Rhizopus. (G.C. Chamberlain)

In Eastern Quebec, the weather conditions during May and early June were favourable for vegetation but also for the spread of bacterial diseases. The only important rainfall during the growing season occurred in the middle of June followed by a prolonged dry spell. Most crops suffered from drought, especially where sowing had been delayed. The exceedingly dry weather prevailing throughout the growing season was likewise not favourable for plant pathogens.

There was a severe outbreak of fire blight during the spring, especially in neglected orchards. Apple scab did not develop to any significant extent, even in the unsprayed orchards. Apple rust was practically absent.

Bacterial blight of beans was less abundant than in 1941 in Eastern Quebec, its spreading being probably due mostly to warm winds disseminating the inoculum in dew droplets from infected plants onto the healthy. In western Quebec, however, where precipitation was normal, bacterial blight of beans was more severe than last year which was a drier year.

Blackleg of potatoes was more severe than usual, favoured by the abundant moisture of the soil and by the warm weather at the time of planting. Ring rot was difficult to detect because sound plants showed wilting due to drought and also because the lack of moisture in light soils prevented the soft rot which usually follows tuber ring rot. On the other hand, on these dry soils, sound tubers showed a marked cracking of the skin at digging time. Many plants examined for bacterial ring rot were found to be affected with fusarium wilt, a disease favoured by the relatively high temperature of the soil. Common scab, equally favoured by warmness and dryness of the soil was prevalent on potatoes and swede turnips this year. Late blight of potatoes which was serious in Western Quebec, where precipitation was normal throughout the season, was not observed in Eastern Quebec due to the drought.

There was practically no rust on cereals in any part of the province this year. Most crops matured so rapidly that diseases failed to cause any damage. Oat blast was severe on certain varieties grown on light soils.

Samples of flax seed from Eastern Quebec were found to harbour the organism causing seedling blight, Colletotrichum Lini, but the disease was not observed in the field. (C. Perrault)

In New Brunswick, the winter of 1942 was about average with considerable snow and rain falling in each month. The fields became bare early in April but on April 11 and 12, 15.5 in. of snow fell, quickly vanishing with warm weather. Sunshine, particularly in the last nine days of April, resulted in the land drying rapidly.

However, the weather was rainy and cloudy during the first week in May and except on very light land, planting operations were not general until after the middle of the month. Less than 1 inch of rain fell during the last 18 days of May. However, growth was vigorous owing to warm temperatures and ample soil water. This was partly due to abundant soil moisture when winter set in and to the absence of drying winds and a deficiency of sunshine during May.

Red clover, alsike, white clover, and the grasses came through the winter with a minimum of winter injury. Raspberries, strawberries, roses, shrubbery, and perennial flowering plants wintered exceptionally well. Apple orchards bloomed one week earlier than usual but the bloom was light.

June was warm and comparatively dry but all crops especially vegetables grew exceptionally well despite the lack of rainfall.

Dry weather during July had a deleterious effect on pasture lands and continued drought during August caused many springs and brooks to dry up. A high wind during the last week in August caused grain to lodge and resulted in a considerable drop of fruit in many apple varieties.

The fall was open and excellent for the harvesting of the grain, potato and root crops. Ploughing continued until Novemver 21 on which night the Saint John River froze over.

The total precipitation for 1942 was 31.7 in., which was considerably below the 29-year average. Many springs, brooks and wells remained dry from August until almost the end of the year. (J.L. Howatt)

Snow coverage during the winter of 1941-42 was variable in Nova Scotia during January, but excellent throughout February. During March the snow cover gradually decreased, leaving bare ground before the end of the month.

Spring weather was generally favourable to agricultural operations during April and the first part of May. Late spring frosts and wet, humid weather during the last half of May and first week of June caused considerable loss to orchardists in the form of frost injury to blossoms or unfavourable weather for pollination.

The summer as a whole was favourable to crop production. Precipitation was spasmodic in the latter part of the season. After a period of dry weather bordering on drought conditions in light soils, a heavy rain occurred in mid August. This resulted in a severe development of both blossom-end rot of tomatoes on light soils and water core in early fall varieties of apples. A month later a very heavy two-day rain giving 3 to 8 inches of precipitation in various parts of the Valley further affected the quality of apples and aggravated the late-blight rot in potatoes. October rainfall aided the spread of late blight and kept the soil in a very moist condition. There was no lack of soil moisture when winter set in. (J.F. Hockey)

In Prince Edward Island, the moderate 1941 winter left tree and small fruits in a generally vigorous condition with the exception of some severe winter damage to raspberries and pith injury to apple trees resulting from freezing due to a prolonged freezing rain. On account of the favourable weather conditions, pruning was successfully carried out and seeding completed early. By late May, tender crops such as beans, corn, cucumbers, etc., were well established and in a high state of vigour. Apple scab spore discharge was observed June 2 following light rainfall and warm weather. Subsequently, during the same month, leaf infection became general and in some orchards, heavy. During June, the weather was mild with occasional light rains. July was a month of constant rainfall. Potatoes made good growth, but the disease situation was serious. There was a big increase in leaf roll; and late blight made its initial appearance, later to become destructive in many fields and finally, due to prolonged wet weather, to cause an enormous amount of tuber rot. Plasmodiophora Brassicae, with ample free moisture for abundant spore germination, was very destructive in the seedling stage to swede turnips, some fields being a total loss. Later, the rainy weather in September was particularly favourable to the spread of club root, which resulted in a loss of thousands of bushels. Verticillium wilt of potatoes, was less apparent under conditions of wet weather and its presence was further masked by late blight. Nevertheless examination of test-plot tubers revealed a severe attack. An unexpected increase in common scab of potatoes was observed despite a wet September; possibly this was due to intermittent high temperatures during the growing season (R.R. Hunt)

Phenological Data: 1942

by

R.C. Russell

The phenological data in the accompanying table are compiled from the records of B. Peturson, Winnipeg; M.W. Cormack, Edmonton; and R.C. Russell, Saskatoon.

The data are of more than usual interest because of the comparatively cool, wet conditions prevailing throughout the Prairie Provinces during the summer. The spring season opened somewhat early at all three places, but the wheat was sown unusually late at Winnipeg and Saskatoon. Commencing about the third week in June, the native plants began to show the effects of the abundant moisture and relatively low temperature, so that most of them which bl6omed after that date were late in coming into flower. At all three places, the wheat harvest was delayed considerably more than the flowering of the late-blooming native plants. This was especially the case at Saskatoon, where the weather in August was very ill-suited to ripening the grain.

For nine plants in the main list, Dr. W.H. Minshall supplied the dates on which they were first seen in anthesis at Ottawa. These dates are as follows:-

Populus tremuloides 17/4
Acer Negundo 25/4
Prunus pennsylvanica 2/5
Smilacina stellata 8/5
Viola canadensis 30/4
Anemone canadensis 28/5
Bromus inermis 17/6
Phleum pratense 21/6
Solidago canadensis 27/7

Mr. Peturson also supplied the dates when the following rusts were noted in Man.:

Puccinia triticina 8/6
P. secalina 13/6
Melampsora Lini 23/6
Puccinia anomala 29/6
Puccinia coronata 13/7
P. graminis tritici 13/7
P. graminis Avenae 25/7

Summary of Phenological Data taken at Winnipeg, Saskatoon, and Edmonton in 1942

Species	Winnipeg a	Winnipeg b	Saskatoon a	Saskatoon b	Edmonton a	Edmonton b
Pulsatilla Ludoviciana	-	-	15/4	3 E	20/4	5 E
Populus tremuloides	20/4	7 E	20/4	2 E	20/4	2 E
Plox Hoodii	-	-	28/4	N	-	-
Ulmus americana	23/4	6 E	-	-	-	-
Acer Negundo	25/4	10 E	4/5	1 E	29/4	3 L
Betula papyrifera	-	-	6/5	2 E	6/5	1 E
Thermopsis rhombifolia	-	-	7/5	1 E	-	-
Prunus americana	9/5	2 E	-	-	-	-
Amelanchier alnifolia	-	-	10/5	1 E	11/5	1 E
Hierochloë odorata	12/5	6 E	17/5	2 L	-	-
Prunus pennsylvanica	-	-	17/5	1 E	12/5	2 E
Viola canadensis	-	-	15/5	1 L	19/5	2 L
Smilacina stellata	-	-	22/5	1 L	25/5	2 L
Prunus melanocarpa	-	-	23/5	N	24/5	2 L
Crataegus sp.	24/5	2 L	24/5	1 L	-	-
Prunus virginiana	25/5	2 L	-	-	-	-
Svida sp. (Cornus sp.)	27/5	N	27/5	1 E	Frozen	-
Lonicera glaucescens	-	-	31/5	2 E	10/6	3 L
Elaeagnus commutata	-	1	2/6	2 L	2/6	2 L
Viburnum Lentago	3/6	2 L	-	-	-	-
Viburnum trilobum (V. Opulus)	6/6	N	-	-	Frozen	-
Achillea lanulosa	-	-	4/6	3 E	? 2/7	8 L
Diholcos bisulcatus	-	-	8/6	N	-	-
Galium boreale	-	-	9/6	1 E	17/6	2 L
Anemone canadensis	6/6	1 E	-	-	19/6	4 L
Rosa alcea (open prairie)	-	-	15/6	2 E	-	-
Potentilla hippiana	-	-	17/6	2 E	-	-
Campanula petiolata	-	-	22/6	1 L	-	-
Caillardia aristata	-	-	23/6	3 L	-	-
Bromus inermis	25/6	5 L	25/6	3 L	1/7	6 L
Agrimonia striata	-	-	-	-	6/7	7 L
Symphoricarpos occidentalis	-	-	4/7	?	7/7	5 L
Phleum pratense	-	-	-	-	8/7	4 L
Chamaenerion spicatum	-	-	-	-	10/7	3 L
Lactuca pulchella	-	-	5/7	4 E	16/7	3 L
Spiraea alba	-	-	8/7	4 L	-	-
Solidago missouriensis	-	-	13/7	?	-	-
Agastache anethiodora	-	-	-	-	16/7	4 L
Solidago canadensis	-	-	-	-	18/7	2 L
Cirsium Flodmanii	-	-	22/7	7 L	-	-
Oligoneuron canescens	28/7	1 E	28/7	5 L	-	-
Aster laevis	-	-	28/7	1 E	2/8	?
Aster crassulus	-	-	6/8	6 L	-	-
Thatcher Wheat Sown	5/5	13 L	4/5	11 L	24/4	2 E
Emerged	-	-	15/5	7 L	8/5	N
Headed	1/7	7 L	5/7	7 L	5/7	4 L
Harvested	10/8	9 L	22/8	20 L	20/8	8 L

Maladies nouvelles ou d'importance notable

R.O. Lachance

Au Canada la rouille de la tige du blé (Puccinia graminis) n'a pratiquement pas causé de dommage en 1942. Elle s'est développée très tard au cours de la saison et, au Manitoba, on n'en a trouvé que des traces sur les variétés susceptibles. En Saskatchewan et en Alberta l'infestation fut un peu plus grave.

La rouille des feuilles (Puccinia triticina) fut assez abondante sur la variété Red Bobs, susceptible à la rouille des feuilles et à la rouille de la tige et sur les variétés Thatcher et Apex, résistantes à la rouille de la tige, tandis que les variétés Regent et Renown ne furent que légèrement atteintes. La rouille couronnée de l'avoine (Puccinia coronata) et la rouille des feuilles de l'orge (Puccinia anomala) furent plus répandues que d'habitude dans les provinces des Prairies. L'augmentation de la rouille des feuilles de l'orge au Manitoba est attribuée en partie à l'augmentation des étendues ensemencées avec la variété Plush, très susceptible à la rouille des feuilles. Au Nouveau-Brunswick on a acquis de nouvelles preuves que des épidémies locales de rouille couronnée ont pour origine des colonies de l'hôte complémentaire.

Le nématode de l'avoine Heterodera avenae fut observé pour la première fois dans les comtés de Simcoe et d'Ontario, grâce aux travaux du Dr D.F. Putnam (P.D.S. 14: 12-13) qui l'a également observée dans le comté de Waterloo en 1936 (P.D.S. 16: 9-10). En 1937, M.J. Laughland rapporta que ce parasite était généralement répandu en Ontario; toutefois, le nématode en question ne fut pas identifié avec certitude. (P.D.S. 17: 10-11). Les études qu'a poursuivies le Dr A.D. Baker au cours des deux dernières années indiquent qu'un nombre plus considérable de champs sont infestés dans les comtés déjà mentionnés par Putnam mais qu'il n'y a point d'indice que le parasite se propage et envahit d'autres comtés de cette province. La présence du nématode des prairies (Pratylenchus pratensis) sur l'avoine est mentionnée pour la première fois.

Bien que la pourriture pythienne des racines (Pythium spp.) ait causé des lésions graves aux racines des céréales, les conditions de croissance furent si favorables que la régénérescence des parties malades fut générale et les rendements moyens. Cependant la nécrose des racines a retardé la maturité et, partant, augmenté les chances de dégâts par les gelées hâtives. Des isolations faites de plants provenant des champs révèlent que la pourriture pythienne peut endommager considérablement la sétaire italienne (Setaria italica) et le millet commun (Panicum miliaceum).

La présence très généralisée dans les grains d'avoine de l'Helminthosporium Avenae, agent causal des stries helminthosporiennes, est un indice que ce champignon peut en certains cas avoir une importance comme parasite des plantules. En fait, on obtient une infection très grave du feuillage lorsqu'on sème des grains infestés et la pourriture helminthosporienne des plantules s'obtient facilement en serre à des températures plutôt fraîches. L'infection primaire de l'helminthosporiose en réseau (H. teres) de la tache helminthosporienne (H. sativum) peut également provenir des graines infectées.

Le charbon couvert (Ustilago Hordei) et le charbon noir (nu) (U. medians ou U. nigra) de l'orge furent très communs dans la variété Plush au Manitoba. Ces maladies ont détruit de 40 à 50% des épis dans certains champs. Tapke a récemment

rapporté que la moitié des échantillons de charbon nu de l'orge récoltés aux Etats-Unis étaient causés par Ustilago nigra plutôt que par Ustilago nuda. Il est possible qu'il en soit de même au Canada.

La flétrissure bactérienne de la luzerne (Corynebacterium insidiosum) continue de faire des ravages dans les districts irrigués du Sud de l'Alberta. On l'a observée dans toutes les plantations vieilles de 3 ans ou plus et dans une plantation de deux ans. La pourriture du collet due à un basidiomycète croissant à basse température a causé une destruction hâtive de la luzerne dans la principale région à luzerne de l'Alberta, particulièrement dans les districts du Nord et du Centre de l'Alberta où l'on fait la production de semence. Cette maladie de même que les véritables dommages de l'hiver ont causé des dégâts considérables dans la région de production de semence du Nord-Est de la Saskatchewan. Le balai de sorcière (virus) diminue apparemment la longévité des luzernières dans les vallées de Nicola et de Cariboo, C.B.; ceci constitue le premier indice que cette maladie a une importance économique au Canada.

Les maladies du lin ont attiré l'attention des pathologistes au Canada à cause de leur abondance inaccoutumée et de l'importance que leur confère l'augmentation considérable des étendues ensemencées en lin. La rouille (Melampsora Lini) fut générale et a atteint des proportions épidémiques dans certains champs des provinces des Prairies. La variété Bison, la plus généralement cultivée fut très gravement affectée. La variété Redwing est passablement susceptible mais se trouve favorisée dans les sections du Nord à cause de sa hâtiveté. La variété Royal semble passablement résistante. On a observé que la rouille était plus grave lorsqu'un champ était situé près d'un terrain cultivé en lin l'année précédente ou lorsque la graine de semence contenait des fragments de paille de lin rouillé. Les autres maladies du lin dignes d'attention sont l'oxichromose polysoréenne (Polyspora Lini) et l'anthracnose (Colletotrichum Lini).

Le Kok-saghyz ou pissenlit de Russie fut cultivé pour la première fois au Canada en 1942. Une tache bactérienne des feuilles probablement causée par une nouvelle espèce de Xanthomonas fut observée au Manitoba. Une rouille (Puccinia Carthami) fut observée sur le Carthamus tinctorius à Morden, Manitoba et à Saskatoon, Sask.

A cause de sa présence généralisée et de sa virulence la brûlure des tiges et des gousses (Diaporthe Phaseolorum var. Sojae) est la maladie la plus importante qui affecte la fève soja dans le comté d'Essex, Ont., d'après les Drs Koch et Hildebrand. Cette brûlure de même que l'anthracnose (Colletotrichum Glycines) sont des maladies nouvelles pour le Canada. Parmi les maladies importantes de la betterave à sucre dans le Sud-Ouest de l'Ontario, on peut mentionner la phomose des porte-graines (Phoma Betae), la pourriture rhizoctonienne (R. Solani), la pourriture rhizopéenne (R. arrhizus), la racine noire ou fonte des semis (cause non déterminée) et l'anguillulose (Heterodera schachtii).

Parmi les maladies de légumes, la brûlure bactérienne ou graisse (Xanthomonas phaseoli) et la tache bactérienne (Pseudomonas medicaginis var. phaseolicola) des haricots, et particulièrement cette dernière, furent très communes et destructives au Canada principalement dans le sud de l'Alberta. La jaunisse des carottes (virus de la jaunisse de la reine-marguerite) continue de faire des ravages dans les provinces maritimes. Une jaunisse que l'on croit être causée par le virus de la frisolée de la betterave fut observée sur les carottes dans la vallée d'Okanagan, C.B.. La mosaique (virus) du concombre est une maladie

d'importance économique considérable et dans le champ et en serre, en Ontario. Deux maladies ont fait leur première apparition dans la vallée d'Okanagan, ce sont: le mildiou de l'oignon (Peronospora Schleideniana) qui détruisit environ la moitié de la récolte et l'anthracnose de la laitue (Marssonina Panattonniana). Quelques lignées de maïs hybride ont été généralement atteintes d'une pourriture bactérienne des tiges, (Phytomonas dissolvens) à la station de Vineland, Ont. On a observé pour la première fois au Canada sur la poirée les taches ramulariennes et phoméennes des feuilles (Ramularia Betae et Phoma Betae). Une sérieuse épidémie de pourriture phytophthoréenne des tiges (Phytophthora parasitica) de la tomate s'est manifestée à Ottawa. La brûlure hâtive (Alternaria Solani) et la tache septorienne des feuilles (S. Lycopersici) ont causé des dégâts aux tomates dans la péninsule du Niagara, Ont. Le virus X de la pomme de terre est reconnu depuis quelques années comme l'un des constituants du complex des virus responsables de la bigarrure des tomates, mais c'est la première fois qu'on l'observe seul sur les tomates en Ontario; ce virus produit l'acronécrose.

Dans le sud de l'Alberta en 1942 la flétrissure bactérienne des pommes de terre (Corynebacterium sepedonicum) était présente dans environ la moitié de l'étendue en pommes de terre commerciales. Auparavant cette maladie était confinée presque uniquement au vaste district irrigué autour de Lethbridge, mais cette année on l'a observée à Brooks et Rosemary dans l'Est du district irrigué. On l'observa pour la première fois en C.B. cette année.

On trouve la flétrissure bactérienne dans la semence certifiée dans toutes les provinces sauf en Nouvelle-Ecosse. Pour la seconde fois, un seul cas a été observé dans l'Ile-du-Prince-Edouard. Apparemment on est en bonne voie d'éliminer cette maladie dans la semence certifiée au Nouveau-Brunswick, mais elle est encore abondante dans Québec à cause de l'indifférence des producteurs à l'égard des mesures d'hygiène appropriées. Le pourcentage de flétrissure dans les autres provinces est négligeable. Dans le but d'éliminer plus efficacement le danger de contamination de la pomme de terre certifiée par la pomme de terre commerciale, sur une même ferme, on inspecte la pomme de terre commerciale et si on y découvre la flétrissure aucun certificat n'est émis pour de la semence certifiée même si elle est exempte de maladie.

On ne connait pas au juste la gravité de l'infection de la pomme de terre commune mais on croit que la flétrissure dans les pommes de terre communes constitue une menace grave pour les provinces où cette maladie n'est pas encore répandue. En effet la flétrissure bactérienne fut décelée cette année à Vancouver dans les wagons expédiés de l'Alberta, de la Saskatchewan et du Manitoba.

La brûlure tardive (Phytophthora infestans) a causé une réduction notable des rendements au Nouveau-Brunswick et en Colombie-Britannique en raison de son apparition hâtive, tandis qu'au Manitoba les pertes furent considérables à cause plutôt de la pourriture des tubercules; il en fut de même dans le district de Rainy River et dans les comtés de l'Est de l'Ontario. Les pertes ont été un peu moins élevées dans l'Ouest du Québec et dans l'Ile-du-Prince-Edouard.

Bien qu'on ait fait une enquête très soignée en Nouvelle-Ecosse dans les semis de pommes de terre venant d'Angleterre, on n'a pas pu observer d'autre cas de gale noire (Synchytrium endobioticum). L'enroulement est responsable du rejet d'un plus grand nombre de champs aptes à la certification que la mosaique dans la majorité des provinces. Au Nouveau-Brunswick cette maladie n'était pas

aussi répandue qu'en 1941, cependant il y eut une augmentation considérable dans l'Ile-du-Prince-Edouard. Dans Québec, elle fut tout aussi répandue et particulièrement dans le comté de Nicolet.

En 1942, la tige pourpre (virus) fut particulièrement commune dans les Maritimes où on l'avait observé plus ou moins fréquemment depuis 1939. Monsieur D.J. MacLeod (P.D.S. 19: 74) a décrit cette maladie telle qu'on la trouve au Nouveau-Brunswick. Les observateurs affirment que le nombre de plants infectés augmente à mesure que la saison avance. Cette maladie est particulièrement répandue dans la Katahdin, variété sur laquelle elle fut tout d'abord observée tandis qu'un petit nombre de plants seulement de la Montagne Verte sont atteints. On présente un état de questions sur la possibilité que la tige pourpre soit causée par le virus de la jaunisse de la reine-marguerite, particulièrement la lignée qui affecte les carottes. (p. 61)

La tache bactérienne (du Wisconsin) (Pseudomonas mellea) du tabac a été observée pour la première fois au Canada; en effet elle est apparue à l'état épidémique dans le Québec. En Ontario et dans le Québec, la mosaique du tabac est causée partie par le virus de la mosaique du tabac et partie par le virus de la mosaique du concombre. Celui-ci est apparemment plus commun que celui-là dans le Québec où l'on cultive le tabac à pipe et à feuille de cigare sur des étendues plutôt restreintes. La mosaique du concombre est disséminée par les insectes à partir des hôtes vivaces sur lesquels elle hiverne. En Ontario le Rhizopus Oryzae a été la cause de quelques pertes de tabac jaune.

La brûlure bactérienne du pommier (Erwinia amylovora) envahit rapidement l'Alberta où on l'a observée pour la première fois en 1941. Bien que le chancre gleosporien (Neofabraea perennans) du pommier soit commun dans la vallée d'Okanagan, C.B. les pertes qu'il cause ont été considérablement réduites depuis l'introduction du parasite du puceron lanigère (Aphelinus mali). La tavelure (Venturia inaequalis) a causé des dommages sérieux à l'intérieur de la C.B. où elle n'a généralement qu'une importance médiocre et peut être tenue en échec par un programme d'arrosage peu élaboré. Cette maladie fut tout aussi grave dans le sud de l'Ontario à cause des pluies fréquentes. Ailleurs la lutte contre cette maladie n'a présenté aucune difficulté particulière. Le liège (Bitter-pit) (physiogénique) fut général cette année au N.B. et en N.E. et on a observé des cas isolés ou 50% des fruits d'un même arbre étaient affectés.

Des isolations faites par M.W. Jones révèlent que dans la région côtière de la Colombie-Britannique la brûlure des fleurs et des brindilles du cerisier et du prunier est causée dans la majorité des cas par Sclerotinia laxa quoique S. fructicola soit également présent. Il est urgent de faire des études similaires sur la pourriture brune des fruits. Dans le sud de l'Ontario la pourriture brune du pêcher a été la cause de pertes considérables comme conséquence de la saison pluvieuse. La brûlure bactérienne (Xanthomonas pruni) fut très importante dans les vergers de pêchers du sud de l'Ontario et particulièrement dans ceux longeant le Lac Ontario. La maladie X de l'Ouest (virus) du pêcher a augmenté dans le sud d'Okanagan, C.B. depuis la première enquête qu'on a fait dans les vergers de cette région en 1940. Les arbres malades sont souvent difficiles à dépister. Bien que la maladie X (virus) n'ait été observée qu'en 1941 dans la péninsule du Niagara, il est probable qu'elle sévissait dans cette région plusieurs années auparavant. On a ramassé des preuves que le cerisier à grappes n'est pas essentiel à la dissémination de cette maladie mais qu'elle peut se disséminer d'un pêcher à l'autre à

des distances considérables. On a également trouvé des cerisiers à grappes gravement affectés par la maladie X près de Brighton et Port Hope, plusieurs milles à l'est de Toronto.

La tache cible (Cercospora circumcissa) fut grave sur les pruniers et les cerisiers arrhénicoles Sioux à Brandon, Man., bien que ce champignon n'ait pas été mentionné dans ce rapport, on le trouve dans l'herbier sur le P. virginiana récolté en Gaspésie et sur le P. serotina et le P. virginiana récolté en Ontario.

Parmi les maladies des arbres, on peut mentionner la tache labrilléenne des feuilles (L. Coryli) sur le Corylus rostrata en C.B.; la moisissure brune (Gonatorrhodiella Highlei) associée au chancre nectrien sur le hêtre au Nouveau-Brunswick et en Nouvelle-Ecosse; le chancre et le dépérissement fusarien (Fusarium lateritium var. Mori) sur le mûrier en Colombie-Britannique; la brûlure des feuilles (Rhabdogloeum Pseudotsugae) associée au Rhabdocline sur le sapin de Douglas en Colombie-Britannique.

Les principales et les plus intéressantes maladies des plantes ornementales sont: la brûlure bactérienne (Xanthomonas incanae) sur les plantations de serre à Dundas et Toronto, Ont; l'anthracnose (Sphaceloma Rosarum) sur le rosier en Columbie-Britannique et au Manitoba, antérieurement observée sur des spécimens venant de Québec et du Nouveau-Brunswick par le Dr Anna E. Jenkins; la pourriture sclérotienne (S. sclerotiorum) des tulipes en Colombie-Britannique; la rouille (Endophyllum Sempervivi) sur Sempervivum spp. près de Grimsby, Ont., antérieurement observée en C.B.

I. DISEASES OF CEREAL CROPS

WHEAT

ERGOT (Claviceps purpurea) was observed in 9 fields out of 206 examined in Alta.; infection was severe in one field near Lacombe, slight in 3 and a trace in 5 (M.W. Cormack). Ergot was unusually common in wheat in Sask. and caused slight damage to the crop. Moderate infections occurred also in the University plots, Saskatoon (H.W. Mead). Ergot was more common than usual in wheat (T.C. Vanterpool). A slight infection was found on both common and durum wheat at Winnipeg, Man. Germinating sclerotia were gathered there in the field on June 1; the ascospores were about to be discharged (A.M. Brown). A trace of ergot was noted in a field in Queens Co., P.E.I. (R.R. Hurst).

ROOT ROT (Cryptoascus sp.). A 10% infection was observed in one field in Queens Co., P.E.I.

POWDERY MILDEW (Erysiphe graminis) was recorded in 16 fields in Alta.: trace in 6, slight in 7 and moderate infection in 3. It was prevalent in the plots at Edmonton and Lethbridge, where infection ranged from trace to severe. Besides, infection was slight to moderate on a few varieties in the plots at Olds and Lacombe. Powdery mildew was moderate to heavy at Brandon, Man., and light to moderate at Winnipeg.

Powdery mildew was prevalent on most varieties of winter wheat in the plots at Guelph, Ont. (J.D. MacLachlan). A slight infection was observed on Marquis and Thatcher and a trace on duck-bill wheat (Triticum turgidum) at the Botanical Garden, Montreal, Que. (J.E. Jacques). Traces were present on Regent, Huron, Coronation and Rival in the plots on light sandy soil at Ste. Anne de la Pocatière, but none was present in the plots on clay soil (R.O. Lachance).

HEAD BLIGHT (chiefly Fusarium spp.). The records in Western Canada may be summarized as follows: Trace, Spelmar x Marquis, Agassiz, B.C., F. avenaceum isolated (W.L. Gordon); trace, Regent, Lacombe, Alta., F. culmorum (W.C. Broadfoot); trace, Marquis, Lacombe, F. culmorum (W.L. Gordon); trace, Shipman, Sask., F. culmorum developed on 90% of the bleached kernels when incubated (H.W. Mead); traces, F. culmorum isolated from 6 separate collections from Domremy, Duck Lake, and from the University plots, Saskatoon (See H.O. Putnam, U.S.D.A. P.D.R. 26: 328. 1942) (T.C. Vanterpool); slight, Renown, Deloraine, Man., F. culmorum; slight, Renown, Winnipeg, F. culmorum chiefly and F. graminearum; slight, durum wheat, Winnipeg, F. sporotrichioides chiefly and F. Scirpi (W.L. Gordon).

Head blight was prevalent on most varieties of winter wheat about Guelph, Ont.; infection was almost 100% in one plot of Dawson's Golden Chaff at Ontario Agricultural College (J.D. MacLachlan). A trace was present in some varieties at Ste. Anne de la Pocatière, Que. (R.O. Lachance). Traces were present in 35 fields examined in all three counties in P.E.I. Helminthosporium sativum was present in one case (R.R. Hurst).

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.) was recorded in 80 out of 206 fields examined in Alta.; damage was a trace in 39 fields, slight in 36, moderate in 4, and severe in one at Lethbridge. (M.W. Cormack). The disease was widespread and caused moderate damage in most of Sask., although it was less destructive than in 1941. It was exceptionally severe in one section,

which will be described in more detail below. Prematurity Blight was found in 3 fields, where it caused moderate damage (H.W. Mead). A severe form of common root rot was reported from several points in an area of some 4,000 square miles between Cambri, Eastend, and Glentworth in southwestern Sask. On a visit to the Ponteix-Cadillac districts, fields were found where the diseased patches occupied 15-90% of the field-area. The plants in the sickly patches were but 70-80% of the normal height and badly weathered. Paired samples, one square yard in extent taken from normal and diseased patches a few feet apart in 6 fields, showed that the yield in the diseased patches had been cut in half and the weight per 1000 kernels by 28%. Common root-rot ratings, based on internal crown and external subcrown internode lesions, averaged 25% in the normal areas and 62% in the diseased respectively. Incubation of 320 pieces of lesioned tissue from 8 fields yielded Helminthosporium sativum in 80% of the cases. (B.J. Sallans and R.J. Ledingham). Common root rot was prevalent in most sections of Sask. except in the Rosetown clay soils. (T.C. Vanterpool)

Prematurity Blight caused moderate damage over a consider-area around Saskatoon and was even severe in some fields between that city and Duck Lake. The heads were mostly empty, but the plants did not pull easily and lesions on the root were not dark and conspicuous (T.C. Vanterpool). A slight infection was observed on Coronation in a field in Queens Co., P.E.I. (R.R. Hurst).

SEEDLING BLIGHT (Helminthosporium sativum) was severe in a 300-acre field near Edmonton on June 6. The stand was estimated to have been reduced 35%. The seed used was found to be heavily infected (W.C. Broadfoot). Two instances of seedling blight were observed in Reward wheat at Morden and Winnipeg, Man.; 80% of the seedlings were diseased. In both cases, the seed had been heavily infected with H. sativum (F.J. Greaney).

GLUME DISCOLORATION. Helminthosporium halodes Drechs 1. was isolated from material from Kendall, Sask., by W.A.F. Hagborg and determined by J.E. Machacek.

TAKE ALL (Ophiobolus graminis) damage in Alta. was estimated as follows: Trace in 7 fields, slight in 7, moderate in 5 and severe in one at Airdrie (M.W. Cormack). As a result of more rain this season take all was more in evidence than usual; it was observed in 15 fields out of 196 examined. Traces appeared in crops on summer fallow and heavier infections in fields following brome grass or wheat (R.C. Russell). Take all was found at Domremy, St. Louis (2 fields), Aberdeen, Duck Lake and Rosthern during a survey trip on Aug. 20. It caused moderate damage in the affected areas, which varied from isolated patches to 5 to 8% of the field. The soil varied from sandy to heavy loam. A trace was found later at Outlook. The disease was more prevalent in 1942 than at any time in the past 10 years (T.C. Vanterpool).

BASAL GLUME BLOTCH (Pseudomonas atrofaciens (McCull.) Stev. Pl. Dis. Fungi p. 22. 1925; Bacterium atrofaciens McCulloch, Journ. Agr. Res. 18:549. 1920; cf. Dowson, Zentralbl. f. Bakt. u.s.w. Abt. 2, 100:189. 1939, Starr et al. Phytopath. 33:316. 1943) was observed in 6 fields in Alta.; infection was a trace in 2 fields, slight in 3 and moderate in one. A trace was present on spring wheat in the plots at Olds and a trace to slight infection on most of the winter wheat varieties at Lacombe (M.W. Cormack). A light infection was recorded on Reward at Saskatoon, Sask. (H.W. Mead). The organism was isolated from affected Thatcher from Parkside, Sask., sent by Dr. P.M. Simmonds, and its pathogenicity tested (W.A.F. Hagborg).

STRIPE RUST (Puccinia glumarum) was severe on Yorkwin and some hybrid wheats at Sidney, B.C., while none was found on Sun, Red Rock, Golden Sun and Dawlas. Infection was very slight on Dawson's Golden Chaff and Jones Fife in the University plots, Vancouver, and slight to moderate on Ridit, Oro, and Albit at Agassiz (W. Jones). No stripe rust was seen on barley or wheat but a trace occurred on Hordeum jubatum at several points in southern Alta.

STEM RUST (Puccinia graminis) was found in 123 fields out of 206 examined in Alta. Primary infections of stem rust were found at several places in central and southern Alta. in early August. Heavy local infections were recorded at Edmonton, Vermilion, Claresholm, Lethbridge, and Cardston. Very little damage resulted, however, as the spread of rust was checked by the cool weather which prevailed during the latter part of the season. Although stem rust could be collected in almost any wheat field in Alta. by mid-September, only in 2 widely separated areas, viz., Vegreville-Vermilion and Lethbridge-Cardston, did the infection become extensive. In many fields between Calgary and Edmonton, rust was difficult to find. Infection of susceptible varieties was slight to moderate in the plots at Lacombe, Lethbridge, and Olds.

Stem rust was recorded in but 10 fields out of 215 examined in Sask. A very light infection was present on Marquis and Garnet on Aug. 12 at Saskatoon. Late and volunteer wheat of susceptible varieties were moderately infected in September. The season was very favourable for the development of stem rust, but very little was found even on susceptible varieties. This may be attributed to the large acreage of rust-resistant wheat which permitted little inoculum to develop.

Stem rust of wheat was first observed in Man. in 1942 on July 13, fully three weeks later than usual. It developed very slowly and in early August when the wheat crop had reached maturity only traces of stem rust were present on susceptible varieties of wheat and barley. However, towards the end of August moderately heavy infections were present on Hordeum jubatum (B. Peturson). The influence of the weather on the development of the cereal rusts in Man. will be found in the introductory section.

Stem rust was never more than a trace on winter wheat at Guelph; it was confined to late green stools (J.D. MacLachlan). All varieties were nearly free from stem rust at Macdonald College and Ste. Anne de la Pocatière, Que. (R.O. Lachance). An occasional field of wheat about St. Philippe-Clermont, Charlevoix Co., showed rust on Aug. 26. A 40% infection was the heaviest encountered (H.B. Humphrey). Stem rust was not observed during the field survey in N.B. nor in the plots except a 35% infection in a small area in a plot of Garnet (S.F. Clarkson).

LEAF RUST (Puccinia triticina) infection was slight to moderate in the plots at Sidney, Agassiz and the University, Vancouver, B.C. Leaf rust did not appear in Alta. until late July, but soon became prevalent. The very cool, wet weather prevailing after the middle of August apparently did not favour its further development. Whatever the cause, the spread of this and the other rusts was abruptly checked about that time. While leaf rust was general, and in isolated cases severe in fields near Edmonton eastward to the Sask. border and southward to Montana, it reached its greatest development in the Lethbridge and Vegreville-Lloydminster areas. Severe infections were found in several fields

in southern Alberta, where there was also an unusual development of the telial stage. Infection ranged from slight to severe on Thatcher and other susceptible varieties in the plots at Beaverlodge, Edmonton, Lacombe, Olds, and Lethbridge. Leaf rust was widespread and severe in Sask. in late August. It was found at Saskatoon on July 2 on Reward wheat. In the University plots on August 12, Renown and Regent showed resistance while Thatcher, Apex, Marquis, Garnet and Reward appeared susceptible. Yield tests at Indian Head indicated that a reduction was caused by leaf rust in Thatcher, Apex, and Red Bobs.

Although leaf rust of wheat appeared in Man. in early June, it increased very slowly during the first part of the season owing to the abnormally low temperatures (from 4° to 10°F. below normal) which prevailed from the middle of June to the middle of July. On July 15, when the plants had reached the flowering stage, only traces of leaf rust were present on Thatcher wheat. From then to the end of the season temperatures were normal or but slightly below and leaf rust development was exceedingly rapid. By Aug. 5, leaf rust infection ranged from 60 to 90% on Thatcher throughout Man. Regent and Renown carried rust infections of 10% or less and only slight traces of this rust occurred on durum wheat (B. Peturson).

Leaf rust was prevalent on most varieties of winter wheat at Guelph, Ont. (J.D. MacLachlan). Leaf rust was moderate to heavy on Marquis, Thatcher and Reward, 10% infection on durum and even lesser amounts on Astrakan wheat (Triticum polonicum) and duck-bill wheat (T. turgidum) at the Botanical Garden, Montreal, Que. (J.E. Jacques). The severity of leaf rust infection was 60% in the one field still uncut near St. Philipoe-Clermont (H.B. Humphrey). Leaf rust infection varied from 10 to 65% in 5 fields out of 10 examined in N.B.; infection was even lighter on the plots (S.F. Clarkson). Only traces of leaf rust were present in the plots at Charlottetown, P.E.I. (R.B. McLaren).

YELLOW LEAF BLOTCH (Pyrenophora Tritici-repentis (Helminthosporium Tritici-repentis) was absent in localities in Sask. where there were heavy infestations in 1941. After a lengthy search only a few overwintered perithecia were found on stubble in May and June. This fact indicates the importance of the perithecia in the overwintering of the fungus and the initiation of primary infection. It is possible that the hot dry weather, which prevailed from mid-summer onwards in 1941 (P.D.S. 21:6) and the dry conditions of early spring, 1942, prevented the formation of the perithecia (T.C. Vanterpool).

BROWNING ROOT ROT (Pythium spp.) was recorded from only one field, at Nobleford, Alta., where it appeared on wheat after summer fallow. A special survey for the disease was not made in 1942 (M.W. Cormack).

The browning root-rot situation in Sask. this year was similar to that in 1928 when necrotic lesioning of the primary and crown roots of cereals was very severe; yet, growing conditions were so favourable that recovery was general and the yield moderately high. This was true both in fields where root lesioning was severe without accompanying leaf discoloration, and also in those which showed typical leaf symptoms, as well. One effect of the disease on the plant is normally to delay maturity from a few to 14 days. It may, therefore, be reasonably conjectured that, with root necrosis as severe as it was, much of the delay in the ripening of cereals in the central and north-eastern parts of the province was caused by this disease and should not be entirely attributed to the wet and cool weather conditions.

In central Sask. the leaf-yellowing and browning of this disease were not typical. This may largely be attributed to severe late spring frosts and to heavy rains, later in the season, which tended to beat down the outer leaves. However, all the way from Fenton east to Melfort, where frost damage was insignificant or absent, both root necrosis and leaf discoloration were characteristic and severe. In general, the root lesions were longer, but paler in colour, than they have been during the spell of dry years.

The high percentage of wheat fields affected with the disease is partly explained by the fact that there was relatively much more wheat following fallow than wheat on stubble because of the Government fallow bonus for 1941.

Highly parasitic forms of Pythium (P. arrhenomanes group) were isolated from wheat and oats. Moderately parasitic root-stunting forms (P. de Baryanum group) were also prevalent this year. Species belonging to both these groups were found, for the first time in Sask., to be doing considerable damage to foxtail millet (Setaria italica) in experimental plots and to broom-corn millet (Panicum miliaceum) in two farmers' fields. It is suggested that these millets will not do well in districts where browning root-rot of cereals is common (T.C. Vanterpool).

No special survey was made for browning root-rot by the Saskatoon Laboratory in June. However, a 60% infection was noted near Humboldt and lesions were present on the roots of mature plants from Rosthern and Oakshela (H.W. Mead).

SCLEROTIA of Sclerotinia sclerotiorum were received from Somme, Sask., where they were detected in threshed wheat and barley. Upon inquiry the correspondent stated that there was considerable sow thistle in the standing crop, from which the grain containing the sclerotia came. Also, no sclerotia were seen in grain from fields where sow thistle was not plentiful. It would appear, therefore, that the sclerotia came from affected sow thistle plants. The organism was determined by Drs. F.L. Drayton and J.W. Groves from cultures made by them from the sclerotia (R.C. Russell).

GLUME BLOTCH (Septoria nodorum) was observed in 34 fields out of 206 examined in Alta.; infection was a trace in 15 fields, slight in 16 and moderate in 3. A trace to slight infection was present on several varieties in the plots at Lacombe and Olds. (M.W. Cormack). The disease became epidemic in August in Sask. and did considerable damage. Severely infected fields were noted near Moose Jaw and Shellbrook. Leaf infection was heavy. Infected crops presented a dirty brown appearance from the road and the heads were erect and poorly filled (H.W. Mead). Glume blotch heavily infected Regent in a field in Queens Co., P.E.I. (G. McMillan).

SPECKLED LEAF BLOTCH (Septoria nodorum and S. Tritici). A slight to moderate infection (S. Tritici) was observed on Sun, and Golden Sun in the plots at Sidney, B.C., and on Rideau at Agassiz (W. Jones). Speckled leaf blotch was unusually prevalent and severe in all parts of Alta. Twelve specimens were examined microscopically and all were affected by S. Tritici. Infection was a trace in 9 fields, slight in 21, moderate in 48 and severe in 16 out of 206 fields examined. Infection was slight to severe in the plots at Lacombe, Olds, and Lethbridge (M.W. Cormack).

During the late summer and fall, evidence was obtained of the occurrence of Septoria nodorum in certain areas of the Prairie Provinces. Pycnidia were obtained on leaves, glumes, or both of wheat collected at Winnipeg, Morden, Lena, Deloraine and Melita, Man., and Wilmar, Summerberry, Kendal, Wilcox, Melfort, Saskatoon, Silver Grove and Cleves, Sask. The areas chiefly affected were in southern Man. and southeastern Sask. from Winnipeg, Man., west to Regina, Sask., and from Melfort west to the Alberta boundary. To judge by the material examined, damage done by S. nodorum was probably not extensive. In no instance was more than a trace of pycnidia found on the heads, but in some samples abundant pycnidium production occurred on the leaves. The available evidence indicates that, at least in southern Man., only late-sown fields were affected. In such fields, however, damage done to the leaves may have accounted for the stunting of plants and the poor filling of heads of late tillers that were observed in certain localities and found associated with a brown discolaration of the heads. The spores in several collections were longer than given for S. nodorum, but it was clear from a comparison with a specimen of S. Tritici from Edmonton that they were of the nodorum type quite apart from their size (T. Johnson).

Speckled leaf blotch (S. Tritici) was present to some extent on the basal leaves of most winter wheat varieties at the Ont. Agr. College, Guelph, Ont. (J.D. MacLachlan). A moderate infection (S. Tritici) occurred on Karkov winter wheat at Ste. Anne de la Pocatière, Que. (R.O. Lachance).

BUNT (Tilletia caries and T. laevis). A summary of the bunt situation in Western Canada has been prepared by W. Popp from the records of the Western Inspection Division. It is presented in Table 1.

Table 1. Wheat Bunt in Western Canada

Summary of Inspections from August 1 to October 31, 1942.

Class of Wheat	Cars Inspected	Cars Graded Smutty	Percentage Graded Smutty
Hard Red Spring	19,641	14	0.07%
Amber Durum	435	3	0.7
Alberta Red Winter	191	13	6.8
All Classes	20,339	30	0.15%

Bunt was observed in 6 fields in Alta.; infection was trace in 2 fields and slight in 4. A trace of bunt was found in 6 fields in the Moose Jaw-Mossbank-Swift Current area in Sask. A trace was also present in Apex at Saskatoon. Bunt spores were present in 2 out of 25 samples of commercial seed of the 1941 crop examined at the Saskatoon Laboratory and in 6 out of 34 samples of foundation and elite seed. Infection was very slight.

In a field of wheat at Portage la Prairie, Man., 75% of the plants of Polygonum lapathifolium were affected by Ustilago utriculosa. Grain from such a field may be degraded on account of the smut (P.D.S. 12:4) (W. Popp).

LOOSE SMUT (Ustilago Tritici) was recorded as follows: trace in 4 fields in Alta., slight in 2, about 6% in one near Edmonton, and 10% in one of soft wheat near Lethbridge; trace in 2 fields in Sask.; up to 10% of the heads affected in winter wheat at Guelph, Ont.; 2% in one out of 10 fields in N.B.; up to 10% in the 35 fields examined in P.E.I.

BLACK CHAFF (Xanthomonas translucens (J.J. & R.) Dowson var. undulosa (S.J.&R.) Starr & Burkh. Phytopath. 32:600. 1942; Bacterium translucens J.J.& R. var. undulosum Sm., Jones & Reddy, Science ser. 2, 50:48. 1919; X. translucens f. sp. undulosa (S.J.&R.) Hagborg, Can. Journ. Res. Sec. C, 20:317. 1942). Many specimens with distinct bacterial lesions were received from points in Sask. Two on Thatcher were sent to Dr. Hagborg for study. It is believed that an intensive survey would have shown the disease to be quite prevalent (see R. Sprague U.S.D.A. P.D.R. 26: 319. 1942) (P.M. Simmonds). The disease was associated with severe hail damage in a sample from Kyle, Sask., received from Dr. Simmonds; the organism was isolated and identified (W.A.F. Hagborg). Black chaff was found in 6 fields out of 30 examined in south central Manitoba during a survey from July 13 to 17. The crop was about 2 weeks later than usual. After this date, infection at Winnipeg increased rapidly following, when plotted, a steep logarithmic curve. The disease was found on severely shrivelled seed of Thatcher at Benito in September (W.A.F. Hagborg).

BROWN NECROSIS (probably reaction to Puccinia graminis). Severe brown discolorations were present on the stems of Apex and Apex hybrids growing in the greenhouse, Saskatoon, Sask., on April 4. The plants had been dusted with stem rust spores; no bacterial scales were present or no bacterial ooze was obtained by incubating the material in a moist chamber (T.C. Vanterpool).

HEAD DISCOLORATION (non-parasitic). The usual discoloration of Apex was common in Sask. Some spotting was observed in Thatcher and in some instances was identified as black chaff. Seven affected samples were collected, threshed by hand and the kernels of discoloured and clean spikelets studied separately. No difference was noted between the kernels of the two groups. Stem discoloration was also common. (R.C. Russell). From an examination of samples received and from observations made in the fields in early August it was concluded that all the discoloration in the rust-resistant varieties, Apex, Regent, and Renown, was of the non-parasitic type. However, before the end of the month bacteria were present in the lesions in many samples. At first only the glumes were discoloured, but later the rachis and finally the peduncles were likewise affected (T.C. Vanterpool).

Traces of head discoloration were observed on all varieties at Ste. Anne de la Pocatière, Que. (R.O. Lachance). Head discoloration was prevalent in wheat in N.B.; it was especially severe at Bairdsville, with lesser amounts at Waterville and Clearview (S.F. Clarkson). Traces were present in the plots at Charlottetown, P.E.I.; it was reported to be severe in one field at O'Leary (R.R. Hurst).

DRY LEAF BLOTCH (non-parasitic) had resulted in considerable reduction in the photosynthesizing area of the leaves of wheat especially on Apex and in crosses of Apex in the greenhouse beds of the Field Husbandry Department, Saskatoon, Sask., by April 4, 1942. The addition of trace elements to the soil or spraying them on the plants grown in the soil failed to reduce spotting of the leaves (T.C. Vanterpool). A trouble of this nature was prevalent on several wheats in the rust-resistant group in the plots at Fredericton N.B. (S.F. Clarkson)

STEM KINK (non-parasitic) was common in the Field Husbandry greenhouses, Saskatoon, Sask. The lower nodes were soft and growing rapidly; they buckled because the sheath clasped the stem tightly and prevented the elongating stem to slip through (see P.D.S. 12:11) (T.C. Vanterpool).

WHITE TIP (non-parasitic). Head damage was severe in several fields near Lethbridge, Alta., in mid-August.

OATS

HEAD DISCOLORATION (Alternaria, etc.) was very prevalent on oats at Jacksontown, Farmerston and Waterview, N.B.

ANTHRACNOSE (Colletotrichum graminicola) was present on some varieties at the Ont. Agr. College, Guelph, Ont. (J.D. MacLachlan)

POWDERY MILDEW (Erysiphe graminis) slightly infected oats on the lower mainland, B.C., in July. (W. Jones)

COMMON ROOT ROT (Fusarium spp. chiefly). A trace of disease was found in one field near Calgary, Alta.; F. culmorum was isolated from a diseased sample from Wembley. It caused moderate damage throughout Sask.

HEAD BLIGHT (Fusarium sp.) slightly affected Vanguard at the Experimental Station, Lennoxville, Que.; the fungus was fruiting on the heads (R.O. Lachance). Some 0.5% of the heads were affected in a field at Hunter River, P.E.I.; it appeared to be mostly Alternaria, but some Fusarium was present. (R.R. Hurst)

LEAF BLOTCH (Helminthosporium Avenae) infection was moderate in 5 fields, slight in 6, and moderate in one out of 41 examined in Alta.; infection ranged from a trace to moderate in the variety plots at Lacombe and Edmonton (M.W. Cormack). Leaf infection was 60% at Brandon, Man., 77% at Gilbert Plains, 75% at Morden and 58% at Winnipeg in Erban. The seed was heavily infected with H. Avenae. (F.J. Greaney)

A seedling blight was present on Nov. 27, in pots of seedlings in a relatively cool greenhouse of the Cereal Division, Ottawa, Ont. Erban was most affected. The fungus sporulated freely on the lesioned leaves when they were detached and placed in a moist chamber over night or when the potted plants were placed in an incubation chamber for 24 hours. The seedling blight phase of this disease has not been observed in Canada, but there is every reason to believe that it may be destructive in cool wet springs, for the disease is fairly prevalent as a leaf spot and evidence of a considerable infection of the seed is being collected, see R.A. Ludwig below (I.L. Conners). Leaf blotch was present on some varieties at the Ont. Agr. College, Guelph, Ont. (J.D. MacLachlan). In Que., leaf blotch was severe in Chicoutimi, Charlevoix-Saguenay, Quebec, Bellechasse; light in the region of Montreal, in the Richelieu Valley, and about Lake St. Peter, Lake St. John and on the lower St. Lawrence; and moderate elsewhere (D. Leblond). Infection was nil to slight in the plots at Ste. Anne de la Pocatière (R.O. Lachance). Some 47 samples of oat seed were examined by the plating method to determine the extent of seed infection by H. Avenae. These samples were of different varieties from several counties in Que.

Infection ranged from 0 to 56%, and averaged over 15%. The samples may be classified according to the percentage of Helminthosporium-infected seed found, as follows: Below 1% infected, 6 samples; 1-10%, 15; 11-20%, 12; 21-30%, 6; 31-40%, 2; 41-50%, 3; 51-60%, 3 (R.A. Ludwig). Slight amounts of leaf blotch were present in 13 fields in N.B.; otherwise, not over a trace occurred (S.F. Clarkson). Traces were observed in 10 fields in P.E.I., but infection ranged from a trace to 20% in the plots at Charlottetown. (R.R. Hurst)

OAT NEMATODE (Heterodera avenae J. Lind, Sofie Rostrup, E.F. Kolpin Ravn, 1913; H. major (O. Schmidt, 1930) M.T. Franklin, 1940) is now known to be prevalent in many regions that lie between Waterloo and Peterborough in the Province of Ontario. This is the only part of Canada in which it is known to occur, and it has not yet been recorded in the United States. In 1941, injury was frequently very marked in infested fields when the early summer was dry and hot. In 1942, visible injury was much less. However, field examinations showed these nematodes to be thriving and a very favourable season for plant growth was probably responsible for decreased injury. (A.D. Baker)

MEADOW NEMATODE (Pratylenchus pratensis (De Man) Filipjev, 1936) was again encountered in the Uxbridge region, Ont., where it was first found in 1941 by Dr. G. Thorne, U.S. Department of Agriculture. (A.D. Baker)

HALO BLIGHT (Pseudomonas coronafaciens (Ch. Elliott) Stev. Pl. Dis. Fungi p. 27. 1925; Bacterium coronafaciens Ch. Elliott, Journ. Agr. Res. 19:153. 1920; cf. Dowson, Zentralbl. f. Bakt. u.s.w. Abt. 2, 100:189. 1939, Starr & Burkh. Phytopath. 32:601. 1942) was affecting about 15% of the leaf area in a sample of Mabel sent from Creston, B.C., July 29. The disease was also present in a sample sent from Hudson's Bay Junction, Sask. on July 27. In a survey from July 13-17 in Man., 10 fields were found infected out of 13 examined. Infection was a trace to 20%. At Boissevain, 40% of the leaf area was destroyed in a plot of Otoe oats. Infection was moderate in the plots at Morden and a trace at Brandon. (W.A.F. Hagborg)

Halo blight was common in the plots at Edmonton and Fallis, Alta. (A.W. Henry). A slight to moderate infection of a bacterial leaf blotch was found in several fields in Alta., particularly in the Edmonton district. The organism was isolated and proved pathogenic to oats in the greenhouse, but it has not been identified (W.C. Broadfoot). Traces of halo blight were observed at Douglas and St. Stephen, N.B. (S.F. Clarkson). Traces were found in the plots at Charlottetown, P.E.I. (R.R. Hurst)

CROWN RUST (Puccinia coronata) damage was a trace or occasionally slight in Sask. It was found farther west than usual, e.g. at Rosthern, Saskatoon, Mossbank (H.W. Mead). Crown rust was quite prevalent on oats throughout Man. in 1942. In the southern part of the province, infection ranged from 10 to 40%. However, in the northern districts, infection was lighter (B. Peturson). This rust was prevalent on susceptible varieties about Guelph, Ont. (J.D. MacLachlan). Crown rust was severe in Megantic and Arthabaska counties, Que., moderate in the Richelieu Valley, about Lake St. Peter, and in the counties of Lotbinière, Lévis, Bellechasse, Montmagny, L'Islet and Kamouraska; elsewhere it was light (D. Leblond). Many fields were examined on Ile aux Coudres, "but, in no instance, was I able to find either stem rust or crown rust. On the mainland, however, in La Malbaie Valley, where oats is one of the principal crops, crown rust was more or

less general, but not so severe as to cause very much damage. On my return to Montreal, I spent a day in Deux Montagnes Co., where most of the oats had been harvested. However, in a few instances, where they were not, I found both crown and stem rust." The severity of infection was 50-60% in one field at Oka (H.B. Humphrey). Only traces were recorded at Ste. Anne de la Pocatière. (R.O. Lachance)

Crown rust was recorded as usual in the Springhill area, N.B., where escaped buckthorns, Rhamnus cathartica, are known to be present. In the variety plots across the St. John River at Nachwaaksis, infection was 25% on the leaves of Erban and 70% on those of Victory on Aug. 21. Infection was insignificant elsewhere, but the survey was limited to 52 fields, chiefly along the St. John River from below Fredericton to beyond Edmunston. The buckthorn site at Gilbert's Corner reported by Mr. R.P. Gorham, Division of Entomology, last year (P.D.S. 21:11) was visited on July 4. About 100 large bushes and trees were located. The aecia were very prevalent on these plants. This observation is not unexpected since infection was severe on oats in 1941. What the situation was this year was not determined, because the area was not again visited. Specimens of buckthorn were received from Mr. Harry Kelley, Prince William, this fall, but the site has not been explored (S.F. Clarkson). A 30% infection of crown rust, the first to be noted this year, was found on July 27 at Nictaux, N.S. The aecial host was not located, but fields within a mile of the infected one showed no rust. Early sown oats were virtually free from rust in Kings and Hants counties (J.F. Hockey). A rust centre near Nictaux was first encountered during the survey in 1937 (I.L. Conners). Crown rust developed unusually late in the season in P.E.I. and did little damage to early sown oats. Late fields, however, were severely attacked in all parts of the province. (R.R. Hurst)

STEM RUST (Puccinia graminis) was general causing slight damage at Ladner, B.C.; it was also present at Agassiz, late in the season, but damage was negligible (W. Jones). Stem rust was first observed on Aug. 18 on Victory oats at Edmonton, Alta. Later in the season, a few severe local infections were found, but they were usually of slight severity (H.W. Cormack). In general, infection was slight in Sask. Usually not more than 10% of the plants were infected, and only occasionally were these severely rusted. A moderate infection occurred on Banner at Saskatoon on Aug. 3. (H.W. Mead)

Very light infection of stem rust occurred on susceptible oat varieties in Man. in 1942. The rust-resistant varieties such as Vanguard and Ajax, were almost rust-free and only slight traces of stem rust occurred in early fields of susceptible varieties. Late sown fields of susceptible varieties, however, became quite heavily infected. Some of these late sown fields, which represented only a small fraction of the total oat acreage, carried infections of 50%. (B. Peturson)

In Que., stem rust was slight about Montreal, Quebec, in the Richelieu Valley, and the Eastern Townships; elsewhere only traces were observed (D. Leblond). The severity of infection was 50% at Oka on Aug. 29 and there was enough rust, stem and crown, to cause perceptible damage in neighbouring fields (H.B. Humphrey). Traces were present in the plots at Ste. Anne de la Pocatière (R.O. Lachance). Stem rust was severe on Victory from Woodstock to Meductic, N.B., especially 4 miles below Woodstock where infections ranging from 50 to 85% were recorded in 3 fields. The stems were almost completely covered with telia on

Aug. 8, and the grain was badly lodged. This particular centre has not been encountered before and the barberry has not been located. On Aug. 4, 20% of stem rust was present in a field at Hartland, about a third of a mile from a barberry hedge. New locations of the common barberry were found at Fredericton, Petitcodiac, and Grand Falls. Although the two large bushes at Grand Falls bore aecia on 90% of the leaves, the nearest grain field was 3 miles distant and was not affected. The barberries at the other two locations were slightly infected and were a considerable distance from any grain fields. (S.F. Clarkson)

SPECKLED LEAF BLOTCH (Septoria Avenae) was fairly general at Agassiz and Ladner, B.C. (W. Jones). A slight infection was observed in Arthabaska and on the Lower St. Lawrence, Que.; traces occurred elsewhere (D. Leblond). Infection was a trace to slight on the varieties at Ste. Anne de la Pocatière (R.O. Lachance). Speckled leaf blotch was generally prevalent and severe on oats in N.B.; the average infection was 12% (S.F. Clarkson). A slight infection was found in the plots at Charlottetown, P.E.I. (R.R. Hurst)

SMUTS (Loose Smut, Ustilago Avenae and Covered Smut, U. Kolleri). Infection varied from a trace to 5% of the heads in 6 fields out of 41 examined in Alta. (M.W. Cormack). Covered smut was found in 26 fields out of 56 examined in Sask.; 30-50% of the heads were affected in two fields at Lanigan and Watrous, and 5-10% in several others. Loose smut was 1% in one field and a trace in two others. A laboratory examination revealed smut spores on 16 out of 25 ordinary samples, and on 7 out of 21 of elite and foundation stock; infection was a trace (H.W. Mead). The average infection from smut was 6.4% in the 47 fields examined in Man. and in one field 36% of the heads were affected (W. Popp). Loose smut was prevalent about Guelph wherever the grain had not been treated; covered smut was much less common (J.D. MacLachlan). Loose smut destroyed 75-80% of heads of wild oats (Avenae fatua) and about 4% of those of Avena brevis in the Botanical Garden, Montreal, Que. (J.E. Jacques). In Que., infection varied from 0 to 10% for loose smut and from 0 to 50% for covered smut (D. Leblond). Loose smut is quite common in eastern Quebec. Infection varies from 1% to 10% depending on whether one or more years have elapsed since the grower last treated his seed (C. Perrault). Covered smut was observed in 20 fields out of 52 examined in N.B.; the average infection was 1% and highest 25% at Clair. Loose smut was usually not more than a trace in 9 affected fields, but in one the infection was 4% (S.F. Clarkson). Loose smut affected 5% of heads in 3 fields out of 5 examined in N.S. (J.F. Hockey and W.K. McCulloch). Loose smut infection was a trace to 55% in the 17 fields examined in P.E.I. (R.R. Hurst)

BLAST (non-parasitic) was reported as follows: Fairly general in oats, including the varieties Victory, Eagle and Alaska, on the lower mainland, B.C. (W. Jones); present in all fields in Alta. - 5% in 19, 10% in 11, 15% in 5 and 20-25% in 6 with 2-20% in the variety plots at Lacombe and Lethbridge (M.W. Cormack); present in 12 fields out of 56 examined in Sask., with very slight damage (H.W. Mead); no more common than usual, but it attracted the farmer's attention as they did not expect to see that type of injury when moisture conditions were so favourable (T.C. Vanterpool); affected all varieties in the plots at Ste. Anne de la Pocatière, Que., the amount varying from 5% in Mabel to 25% in Banner, and being more severe on light sandy soil than on clay (R.O. Lachance); severe in 5 fields (D. Leblond); present in almost every field in N.B., averaging 10% (S.F. Clarkson); traces in the plots at Charlottetown, P.E.I. and averaging 12% in 6 fields. (R.R. Hurst)

A blight of the panicle very similar to blast and associated with severe lesioning of the flag leaf was found on Cartier oats at Saskatoon, Sask., on Aug. 12. A similar trouble was collected at Meota in 1935. Bacteria were present in the lesions (H.W. Mead)

GREY SPECK (manganese deficiency) caused slight to severe damage to several varieties at Macdonald College, Que.; the season was very dry. (J.G. Coulson)

WIND STORMS caused severe damage between Brandon and Birtle, Man., particularly to the upper leaves. The crop had a grey appearance suggesting frost injury. At Hamiota 50% of the leaf area on 70% of the upper leaves was damaged. Barley was not appreciably affected. (W.A.F. Hagborg)

BARLEY

ERGOT (Claviceps purpurea) was present in a few heads of Success near Sidney, B.C. (W. Jones). It was found in a field at Grand Forks by A.N.L. Butler, Production Service (G.E. Woolliams). A trace to slight infection was observed in 2 fields out of 30 examined in Alta. (M.W. Cormack). Ergot was common on barley in Sask. It caused slight to moderate damage in many varieties and increased rapidly in severity in August. Samples of feed barley (1941 crop) were received from Assiniboia, where loss of several litters of young pigs was reported; sufficient ergot was apparently present to cause stricture of the milk ducts with the result that the young pigs starved to death (H.W. Mead). Ergot was more prevalent than usual in barley. Infection was moderate on Colcess at Saskatoon on Aug. 11, a trace at Rosthern on Aug. 20; severe at Milden, Aug. 27; moderate at Ardath, Aug. 27; and severe at Marymont, Sept. 1 (reported by Dr. W.J. White); ergot was present in a sample of chopped barley (1941 crop) received from Arbuthnot. It was reported that hogs would not eat the barley containing the ergots and horses did not like it (T.C. Vanterpool). Ergot affected 2% of the heads of Plush barley in a field at Gladstone, Man. (J.E. Machacek). A few ergots were found on Duckbill barley at the Botanical Garden, Montreal, Que. (J.E. Jacques). Traces were present in 12 fields in P.E.I. (R.R. Hurst)

POWDERY MILDEW (Erysiphe graminis) was reported as follows: Common on fall barley on Vancouver Island, B.C., causing slight damage; slight infection in plots at Sidney and Agassiz; slight infection in one field at Vauxhall, Alta., and in the greenhouse at Edmonton; slight infection in two fields in Sask. and moderate to severe in spots on Colcess at Saskatoon; slight to severe infection in the 16 affected fields in Man.; prevalent on the varieties commonly grown about Guelph, Ont., and the most serious disease of the district; most prevalent barley disease in Que.; in the plots at Macdonald College, O.A.C. 21 was heavily infected, while Byng was nearly free; at Ste. Anne de la Pocatière present in plots on light sandy soil, but not on clay; traces to 5% of the leaf surface affected in the 12 fields examined in P.E.I.

HEAD BLIGHT (chiefly Fusarium spp.). Slight infection was observed in one field at High River, Alta. (M.W. Cormack). Several reports of head blight were received from Sask. points and it was collected in a field at Leask. The disease was present in small amounts in 30 samples of seed barley of 40 examined. The amount present was considered too small to affect the feeding value. Much discoloration of individual spikelets was found in the plots at Saskatoon. In

some varieties, notably Warrior, a hooded barley, the crop took on a scorched dirty appearance. Isolations yielded mostly Fusarium spp. (chiefly F. culmorum and F. graminearum). It was also severe in one corner of a plot of Prospect at Swift Current. (H.W. Mead)

COMMON ROOT ROT (Helminthosporium sativum and Fusarium spp.). Damage was a trace in 2 fields and slight in one out of 30 examined in Alta. (M.W. Cormack). It caused moderate damage on barley in Sask. and disease ratings were generally as high as those on wheat. Although the barley was badly lodged this year, the lodging did not seem to be caused by root rot. The disease was rather uniformly distributed over the field (H.W. Mead). A slight infection occurred in several varieties in the plots at Macdonald College, Que. (R.A. Ludwig). Root rot caused severe damage in one field of Charlottetown 80 in P.E.I.; Fusarium was isolated from the diseased tissue. (R.R. Hurst)

STRIPE (Helminthosporium gramineum). A trace was noticed in Minsturdi at Winnipeg, Man.; the seed used was from the United States (F.J. Greaney). An occasional plant was found affected in the plots at Guelph (J.D. MacLachlan); the determination was confirmed from material submitted. (I.L. Conners)

SEEDLING BLIGHT (Helminthosporium sativum). The etiology of this disease has been investigated in some detail by H.W. Mead (Can. Jour. Research 20 (Sec. C):501-523, 525-538. 1942). Spikelets become parasitized from flowering time onwards by air-borne spores or fragments of mycelium, and the fungus causes a blighting, shrivelling and discoloration of spikelets and maturing kernels. Mycelium or ungerminated spores in or on the seed germinate with the kernel to affect the young seedling. The greatest seedling injury occurs when conditions are unfavourable to the host. Greatest recovery occurs in cool moist soils. Packing and applications of fertilizer tend to increase infection, although the latter usually increases the dry weight of the seedlings. (I.L. Conners) Seed of Charlottetown 80, heavily infected with H. sativum, when sown resulted in 85% of the seedlings being infected at Brandon, Man.; 80% at Gilbert Plains; 93% at Morden; and 85% at Winnipeg (F.J. Greaney). H. sativum was found on a sample of foundation stock when the seed was germinated at Guelph, Ont. (J.D. MacLachlan)

SPOT BLOTCH (Helminthosporium sativum) was slight on Byng, Sanalta and Nobarb at Agassiz, B.C. Infection was a trace in 11 fields, slight in 4 and moderate in 2 out of 30 examined in Alta.; infection was a trace to slight in the plots at Lacombe and Olds.

NET BLOTCH (Helminthosporium teres). Infection was a trace in 7 fields, slight in 5, moderate in one and severe in one out of 30 examined in Alta. Infection ranged from a trace to slight in the plots at Olds and from a trace to moderate at Lacombe. Slight infections were noted at Kanaston, Tisdale, Forget, and Naicam in Sask. Net blotch was moderate at Macdonald and slight at Winnipeg, Man.

H. teres was isolated from 0-28% of the seeds in 10 samples from Macdonald College, Que., when the seeds were plated (R.A. Ludwig). Net blotch infection varied from a trace to moderate at Ste. Anne de la Pocatière. It was severe on Byng at Macdonald College (R.O. Lachance). The disease was not very prevalent in Quebec as a whole (D. Leblond). Traces were observed in 12 fields examined in P.E.I. (R.R. Hurst)

LEAF RUST (Puccinia anomala) was severe on Univ. of Alberta, Peatland, Regal, Wisconsin Pedigree, and Olli; moderate on Sanalta, Trebi, and Plush and slight on Byng in the plots at Agassiz, B.C. Rust was common on fall barley on the Lower Mainland and Vancouver Island and caused considerable injury to the leaves (W. Jones). A trace to slight infection was found in 8 fields out of 30 examined in Alta. The rust was first noticed in the plots at Edmonton on Aug. 18, where later the infection was slight to moderate (M.W. Cormack). Leaf rust was unusually common this year and did considerable damage in Sask. (H.W. Mead). Infection was severe on Colcess at Saskatoon (T.C. Vanterpool). Leaf rust of barley was general throughout Man. in 1942. Although infection was generally light, except in some fields of Plush barley, the rust was more prevalent than usual. Infection ranged from a trace to 10% on O.A.C. 21 and Trebi. On the other hand, infection averaged upwards of 50% in some fields of Plush. The increase in prevalence of this rust in Man. in 1942 may be ascribed, in part, to the cool weather which prevailed during most of the growing season, and in part to the increase in acreage of Plush barley, a variety very susceptible to leaf rust. (B. Peturson)

Leaf rust was prevalent on the commonly grown varieties at Guelph, Ont. (J.D. MacLachlan). Leaf rust was second only to powdery mildew in prevalence in Que. (D. Leblond). Infection was 50% on M.C. 2222, a trace on Plush, Velvet and Byng and absent on the other varieties at Ste. Anne de la Pocatière (R.O. Lachance). A trace of leaf rust was observed in one field in N.B. and on some varieties at Fredericton (S.F. Clarkson). Leaf rust was not observed on the main crop in western N.S., but infection was 60% on some volunteer plants of Charlottetown 80 at Morristown (J.F. Hockey). A light infection on volunteer plants was recorded in Queens Co., P.E.I. in September. (R.R. Hurst)

STEM RUST (Puccinia graminis). A trace was found in 5 fields and a slight infection in one out of 30 examined in Alta. Stem rust was of minor consequence at Guelph, Ont. It was the least prevalent of the barley diseases in Que. Infection was estimated to be a trace to 25% in P.E.I.; on some volunteer plants it was 15%.

SEEDLING BLIGHT (Rhizoctonia and Helminthosporium). Affected seedlings were sent in from Carrot River, Sask. The average damage was slight, being mostly confined to the drier parts of the field. (H.W. Mead)

SCALD (Rhynchosporium Secalis) was very severe on Olli, Gatami, O.A.C. x Olli; severe on O.A.C. 21, slight to moderate on many others; but only a trace on Barks at Sidney, B.C. A moderate infection occurred on Trebi and not more than a trace on other varieties and hybrids at Agassiz (W. Jones). Spores were abundant on lesions on specimens of Peatland received from Agassiz, May 9. Scald was also present on one collection made at Scott, Sask. by R.F. Peterson on Aug. 5 (W.A.F. Hagborg). Infection was a trace in 3 fields and slight in 4 out of 30 examined in Alta.; infection was a trace to severe in the plots at Edmonton and Lacombe. (M.W. Cormack)

COVERED SMUT (Ustilago Hordei). A trace was present in 4 fields and 1% in one in Alta. (M.W. Cormack). Covered smut was recorded in 14 fields in Sask. with an average infection of 3%, but in one at Swift Current 65% of the heads were smutted. A laboratory examination of seed from the 1941 crop disclosed the presence of a light sprinkling of spores (believed to be of U. Hordei) on all 18 commercial samples and on 4 out of 6 foundation and elite stock

samples. It was also severe on Plush and Prospect in the plots at Saskatoon (H.W. Mead). Covered smut was commoner than usual in Sask. It was severe in the plots and on the University seed farm at Saskatoon, severe at Milden on a 2-rowed variety and moderate at Broderick. In one sample received the smutted kernels were quite hard and had been mistaken for ergot by the elevator agent (T.C. Vanterpool). Covered smut was slight on Duckbill and moderate on Hulless Golden in small plots at the Botanical Garden, Montreal, Que. (J.E. Jacques)

In Man., 204 fields were examined for smut and only 10 fields were found free from infection. The average infection was 4.1%. In Plush, the leading variety, the average was 8%, while it was 2% in the other varieties. Three species of Ustilago were found, viz. U. medians, U. nuda and U. Hordei. U. medians and U. Hordei were very prevalent in Plush barley causing between 40-50% damage in some fields, but these species were much less prevalent in other varieties. U. nuda caused little damage except in 2 fields where 9.5% and 7% of the heads respectively, were affected. The smut caused by U. medians is sometimes called black smut because an affected head is slightly blacker than one attacked by the ordinary loose smut and seems to lack the olive-green tinge of the latter. (W. Popp)

V.F. Tapke (Phytopath. 33:194-209. 1943) has reported the results of germination of 500 specimens from 33 States on 2% potato-dextrose agar at 20° C. All but six samples "had the loose type of smutted head and echinulate spores". Of these, "192 produced the mycelial germination of Ustilago nuda, 209 the sporidial germination of U. nigra and 93 produced, on germination, a mixture of the normal mycelial and sporidial types and otherwise conformed to the description of U. medians Biedenkopf. All the 93, however, proved to be simply mixtures of the mycelium-producing U. nuda and the sporidial-bearing U. nigra". He concludes that a smut answering to the description of U. medians apparently does not exist. U. nigra has become as widespread as U. nuda in the United States and the indications are that through simple seed treatment half of the annual 2-million-bushel loss attributed to barley loose smut may be prevented. Samples from widely scattered points in Canada should be examined to determine its distribution here. (I.L. Conners)

LOOSE SMUT (Ustilago nuda) was recorded as follows: A slight infection in Newal, Plush, Rumania 82A, Reka and a few other varieties at Sidney, B.C., and in Plush at Agassiz; a trace in 5 fields, 1% in 2 and 5% in one in Alta., and a trace to slight on a few varieties at Edmonton and Lacombe; in 6 fields out of 30 examined in Sask., heaviest infection being 10-20%; 0.7% in Byng in plots at Ste. Anne de la Pocatière, Que.; trace to 3% in N.B.; 3% in one field at Upper Musquodoboit, N.S.; a trace to 5% in fields and a trace to 1% in plots in P.E.I.

BACTERIAL BLIGHT (Xanthomonas translucens (J.J.&R.) Dowson, Zentralbl. f. Bakt. u.s.w. Abt. 2, 100:190. 1939; Bacterium translucens Jones, Johns. & Reddy, Journ. Agr. Res. 11:636. 1917; cf. Starr & Burkh. Phytopath 32:600. 1942, Starr et al. Phytopath 33:316. 1943; X. translucens f. sp. hordei Hagborg, Can. Journ. Res. Sec. C, 20:317. 1942). Typical lesions on the leaves and heads and bacterial ooze on the stems were found at Saskatoon, Sask., and on barley injured by hail at Kyle (H.W. Mead). The disease caused severe damage to a large plot of Colcess at Saskatoon; the heads were not filling. (T.C. Vanterpool)

Bacterial blight (X. translucens f. sp. hordei-avenae Hagborg l.c.; cf. Starr et al. 33:316. 1943) was not found in the 12 fields examined in south-central Man., but infection was severe in the plots at Brandon and Winnipeg, although absent at Morden. (W.A.F. Hagborg)

RYE

ERGOT (Claviceps purpurea) was found at Grand Forks, B.C. by A.N.L. Butler, Production Service (G.E. Woolliams). Infection averaged one ergot per head in a field near Edmonton, Alta., and was slight to moderate in the varieties at Lacombe (M.W. Cormack). In a plot at Saskatoon, Sask., infection was a trace to slight on first growth, but was very severe on the culms formed later. Heavy rains, after early growth was completed, resulted in abundant growth of later culms, which frequently exceeded the former in length (T.C. Vanterpool). Ergot was very common and severe in late August and early September. The amount of infection increased rapidly during August. It was severe on Dakold and Prolific at Saskatoon on Sept. 1 (H.W. Mead). Slight infection occurred in both fall and spring rye at Winnipeg, Man. (A.M. Brown). Ergot was common about Guelph, Ont. (J.D. MacLachlan). About 80% of the plants bore sclerotia at the Botanical Garden, Montreal, Que. (J. Emile Jacques). Some 3% of the heads bore ergots in a field in P.E.I. on Sept. 22 (R.R. Hurst). A trace only was found in rye fields examined in Kings and Annapolis counties, N.S. (J.F. Hockey)

POWDERY MILDEW (Erysiphe graminis). A trace to slight infection occurred on a few varieties at Lacombe, Alta.; of common occurrence at Guelph, Ont.; heavy infection on spring rye and will rye (Secale montanum) in the Botanical Garden, Montreal, Que.

HEAD BLIGHT (Fusarium spp.) affected 0.5% of the heads in a field in Queens Co., P.E.I. (R.R. Hurst)

STEM RUST (Puccinia graminis). Slight infection was found in a field of Viking and a trace on White Russian at Lacombe, Alta.; light infection in a field near Kinistino, Sask., and on a sample from Cungre; a trace on all varieties at Ste. Anne de la Pocatière, Que.; 5-10% infection on spring rye in Queens Co., P.E.I.

LEAF RUST (Puccinia secalina). Infection was slight in one field and slight to moderate on varieties at Lacombe, Alta.; a general light infection ranging from a trace to 5% in Man. in 1942; generally prevalent at Guelph, Ont.; infection unusually heavy throughout the season on winter rye and Secale montanum and moderate on spring rye at the Botanical Garden, Montreal, Que; trace to slight on the varieties at Ste. Anne de la Pocatière; traces in the plots at Fredericton, N.B.; heavy infection in a field at Kentville, N.S.; infection 40-50%, occasionally 70%, in Queens Co., P.E.I.

SPECKLED LEAF BLOTCH (Septoria Secalis). Infection was slight to moderate in the plots at Lacombe, Alta., and a trace at Ste. Anne de la Pocatière, Que.

II. DISEASES OF FORAGE AND FIBRE CROPS

ALFALFA

BLACK STEM (Ascochyta imperfecta) was not observed early in the season in Alta., but was found in 8 fields out of 10 examined in August. Infection was estimated to be a trace in one field, slight in 4 and moderate in 3. Infection was slight to moderate in the plots at Lacombe and Lethbridge and slight to severe at Edmonton.

BACTERIAL WILT (Corynebacterium insidiosum (McCull.) Jensen, Proc. Linn. Soc. N.S.W. 59:41. 1934; Aplanobacter insidiosum McCulloch, Phytopath. 15: 497. 1925; cf. Dowson, Trans. Brit. Myc. Soc. 25:313. 1942, Starr & Burkh. Phytopath. 32:603. 1942) was again quite general in old alfalfa fields at the Experimental Station, Summerland, B.C.; affected plants were dying rapidly (G.E. Woolliams). Bacterial wilt was found in 81 out of 114 stands of alfalfa examined in the irrigated districts of southern Alta. in early June. It was present in all of the 75 stands three years old or older, and the damage occurring in 1942 was estimated to be a trace in 6 fields, slight in 29, moderate in 24, and severe in 16. In addition, a few plants were found dying in 3 two-year-old stands in the Brooks district and in one at Lethbridge. Damage in young stands has not been observed previously in Alta. and apparently occurs infrequently in the United States (M.W. Cormack).

ROOT ROT (Cylindrocarpon Ehrenbergi, etc.). Damage mainly caused by C. Ehrenbergi was found in 4 fields out of 114 examined in southern Alta. and 3 out of 30 in the central and northern sections of the province. Severe damage was present in one field near Westlock, moderate injury in 2, slight in 3 and a trace in one (M.W. Cormack).

M.W. Cormack (Sci. Agric. 22: 775-786. 1942) finds that the "pathogens attacking alfalfa and sweet clover during the early spring rank, in order of the destruction caused, as follows: the low-temperature basidiomycete, Cylindrocarpon Ehrenbergi, Sclerotinia sativa and Fusarium avenaceum". With growing sweet clover the fungi occupy the following order: Phytophthora Cactorum, F. culmorum, F. avenaceum and S. sativa. Alfalfa is more resistant than sweet clover. Some differences in resistance were noted in the different varieties and the behaviour differed also depending on the pathogen.

In a stand of alfalfa at Macdonald College, Que., crown rot affected 20% of the plants and apparently caused the death of some. The diseased tissue, when plated, yielded mainly a Cylindrocarpon, which appeared to be C. Ehrenbergi (R.A. Ludwig).

DOWNY MILDEW (Peronospora aestivalis) caused moderate damage in a field near Sidney, B.C. (W. Jones). It was quite generally distributed through the interior districts of B.C., although it did not appear to cause much injury (G.E. Woolliams). A slight infection was present in a field at Okotoks, Alta., and in the plots at Edmonton (M.W. Cormack).

ROOT ROT (Plenodomus Meliloti). Moderate rotting and abundant pycnidium production was observed on the lower portions of the roots of a few plants in the plots at Saskatoon, Sask. (M.W. Cormack).

YELLOW LEAF BLOTCH (Pseudopeziza Jonesii). A slight infection was found in the plots at Edmonton, Alta.

COMMON LEAF SPOT (Pseudopeziza Medicaginis) was quite general throughout the interior districts of B.C., where it usually was found on uncut plants. In the drier regions, it was usually located along irrigation flumes, where there is more moisture. This leaf spot was found in all 10 fields examined in Aug. in Alta. Infection was a trace in one field, slight in 6 and moderate in 3. Infection was slight in the plots at Lacombe and Lethbridge, but it ranged from a trace to severe at Edmonton, where there was considerable defoliation. The disease was severe on Hardigan, Ladak and other varieties at Morden, Man.; slightly infected the second crop at Ste. Anne de la Pocatière, Que.; and infection varied from trace to 35% throughout P.E.I.

LEAF SPOT (Pseudoplea Trifolii (Rostr.) Petrak) was fairly general in the University plots, Vancouver, B.C. on July 24 and caused slight damage (W. Jones). Perithecia were scarce on material submitted, but one was found with fairly mature spores. J.H. Miller (Am. Jour. Bot. 12: 224-237. 1925) is of the opinion that the fungus is a saprophyte, which develops following injury of the plant from some other cause including insect injury. This fungus was collected on alfalfa at Brandon, Man., in 1923 (P.D.S. 4: 28) and on alsike clover at Canora, Sask. (Bisby, Fungi Man. & Sask. p. 53, 1938)(I.L. Conners).

WILT (Sclerotinia ?Trifoliorum) slightly infected Ladak, Autogamous, Hardiston and Maesal at the Station, Sidney, B.C. (W. Jones).

CROWN ROT (a low-temperature basidiomycete). Early spring killing of alfalfa by the crown-rot pathogen was found in all principal alfalfa-growing areas of Alta. in 1942. In Table 2, the estimated damage by fields is given for each district.

Table 2. Estimated damage caused by crown rot in alfalfa fields examined in Alberta in 1942.

District	Fields Examined	Fields Damaged	Fields according to estimated damage			
			Tr.	Sl.	Mod.	Sev.
Cherhill-Sangudo	20	19	4	3	4	8
Westlock	16	13	0	3	5	5
Edmonton-Lacombe	14	13	2	6	4	1
Brooks	79	27	3	8	14	2
Lethbridge	35	13	0	6	4	3
ALL	164	85	9	26	31	19
Percentage of fields damaged:						
in Northern & Central Alta.		90%	12%	24%	26%	28%
Southern Alta.		35	3	12	16	4
All Alta.		52	5	16	19	12

The most severe damage found was 75% in a field north of Westlock. Crown rot was again most prevalent in the Cherhill-Sangudo district, but the killing was in general less extensive than in 1941. It consisted mainly in the

extension of the patches previously killed out and in the killing of scattered individual plants or small patches. In southern Alta., there was much less crown rot than in the northern and central areas, but it occurred in many intances in the same fields as bacterial wilt and undoubtedly aggravated the damage. True winter killing of alfalfa by frost action was not observed (M.W. Cormack).

A survey was made in June of the extensive killing which occurred at White Fox and the alfalfa seed-growing areas of northeastern Sask. Both crown rot and true winter-killing occurred. Severe crown-rot damage was found in 16 fields of the 21 examined, but in 14 of these typical winter-killing was also present. Counts made in these fields, however, indicated that crown rot was the more prevalent. Damage of both types was markedly reduced or absent in those portions of fields which had retained a good snow cover. A few alfalfa plants killed by crown rot were also found in the plots at Saskatoon (M.W. Cormack). Of the 21 fields, 14 were considered worthless and several others in the districts had already been ploughed up before the survey was made (P.M. Simmonds).

MOSAIC (Medicago virus 2). A trace was found in a plot at the Station, Fredericton, N.B. (D.J. MacLeod).

WITCHES' BROOM (virus). Attention is called to the occurrence in south-central B.C. of witches' broom of alfalfa and other legumes as described by Heald and Menzies in Washington State. In the course of studies on longevity of alfalfa stands in B.C., notably in the Nicola and Cariboo Valleys, typically affected plants have been noted and the condition was associated with the killing out of the stands. "Boron-tested plots in 1941-42 have failed to display any recovery or difference in rate of killing".

After being shown the disease as it occurs at Prosser, Wash., by Mr. Menzies, there is little doubt that the trouble in B.C. is identical with that in Washington. The disease so far is local, but in the Nicola Valley there are one or two fields, where alfalfa stands last for only 3 or 4 years as a result of the disease (V.C. Brink).

According to F.D. Heald and J.D. Menzies (51st Ann. Rept. Wash. Agr. Exp. Sta. Bull. 410: 83-84. 1941) witches' broom is present in 4 counties in Washington but is only serious in the Methow Valley area of Okanagan County. They consider the trouble to be identical with that found in Australia by E.T. Edwards (Dept. Agr. N.S.W. Sci. Bull. 52. 1936). Experiments so far indicate that varieties resistant to bacterial wilt are susceptible to witches' broom. However two selections free from both were to be tested in Methow Valley in 1942. Witches' broom was first reported on alfalfa in B.C. in 1932 (P.D.S. 12:25) and in Alta. in 1940 (P.D.S. 20: 20). It has been reported on sweet clover from Alta. (P.D.S. 20: 22 and 41: 19) and a specimen collected by Mr. H. Groh at Dawson City, B.C., Sept. 3, 1934 is in the Mycological Herbarium (I.L. Conners).

Damage from witches' broom again increased in plots under observation at Edmonton, Alta. The symptoms also appeared in many of the plants grown from cuttings taken from a plant which was very slightly affected (M.W. Cormack).

COMMON CLOVER

ROOT ROT (Cylindrocarpon Ehrenbergi, etc.) damage was severe in a field of alsike at Westlock, Alta., and slight to moderate in all varieties of alsike and red clover in the plots at Lacombe (M.W. Cormack).

SOOTY BLOTCH (Cymadothea Trifolii) moderately infected alsike clover at Scandia, Alta. (M.W. Cormack). Traces were present in many fields of red clover in P.E.I. (R.R. Hurst).

POWDERY MILDEW (Erysiphe Polygoni). Slight to moderate infection on red clover at Edmonton (M.W. Cormack); moderate infection on the leaves in the red clover plots at Fredericton, N.B., on July 17, 1936 (I.L. Conners); slight infection in Queens Co., P.E.I. (R. Bognall).

ROOT ROT (Fusarium spp.) was present in red clover at Guelph, Ont.

ANTHRACNOSE (Kabatiella caulivora) must have been rather prevalent in the red clover plots at Fredericton, N.B., in 1936, judging by specimens collected. On some of the older lesions Fusarium sp. and Stemphylium sp. indet. fide J.W. Groves were present. Anthracnose has been reported from Alta., Ont., Que., and P.E.I. and specimens are in the herbarium from the first two provinces (I.L. Conners).

MID-VEIN SPOT (Mycosphaerella carinthiaca). Only a few spots were present on leaves of red clover collected in the plots at Fredericton in 1936, but the fungus was well developed in the spots examined. Material collected at Woodstock in the same year has already been reported (P.D.S. 17: 15) (I.L. Conners).

COMMON LEAF SPOT (Pseudopeziza Trifolii). Infection was slight at Ste. Anne de la Pocatière, Que. (R.O. Lachance); moderate in the plots on red clover at Fredericton, N.B., in 1936 (I.L. Conners); heavy in a field in P.E.I. (R. Bognall).

ROOT ROT (Sclerotinia Trifoliorum) was present on red clover in some areas about Guelph, Ont. (J.D. MacLachlan) and caused extensive killing in the plots at Macdonald College, Que. (R.A. Ludwig).

LEAF SPOT (Stemphylium sarcinaeforme) infection was general and damage was moderate on red clover at Aldergrove, B.C. in August (W. Jones).

RUST (Uromyces Trifolii). Common in the lower mainland, B.C., on red clover and occasionally causing much damage (W. Jones); slight infection general on Ottawa 189 at Morden, Man. (W.L. Gordon); slight infection on the second crop of alsike and red clover at Ste. Anne de la Pocatière, Que. (R.O. Lachance); fairly heavy on the lower side of the leaves, on petioles and stems of red clover in the plots at Fredericton, N.B., in 1936 (I.L. Conners); general infection on second growth of red clover at Halls Harbor, N.S. (J.F. Hockey); traces to heavy on red clover at Charlottetown, P.E.I. (B. McLaren).

CROWN ROT (a low-temperature basidiomycete) was found for the first time on alsike clover. The damage was moderate in one field and severe on volunteer plants at the edge of an alfalfa field at Cherhill, Alta. (M.W. Cormack).

MOSAIC (virus). Found on red clover in the Dominion Forage Crops greenhouse, Saskatoon, Sask. on Feb. 13 (T.C. Vanterpool); of common occurrence about Guelph, Ont. (J.D. MacLachlan). A trace of mosaic (Trifolium virus 1) was found on white clover at Sackville, N.B.; a trace of mosaic (Pisum virus 2) in a patch of alsike in York Co. and in a field of red clover in Kings Co. (D.J. MacLeod).

GENETIC CHIMERA. Two plants of red clover were found at the Station, Fredericton, N.B., where sectors of the leaf or whole leaves were almost white while the other portions or leaves were a normal green (D.J. MacLeod).

POTASH DEFICIENCY was common in many fields of red clover throughout P.E.I. (R.R. Hurst).

SWEET CLOVER

ROOT ROT (Fusarium avenaceum) caused slight damage in the plots at Saskatoon, Sask. F. avenaceum was isolated from the diseased roots (M.W. Cormack).

LEAF SPOT and STEM BLIGHT (Leptosphaeria pratensis(Stagonospora Meliloti) was a trace in one field and slight in 2 out of 10 examined in Alta. (M.W. Cormack). It was present on sweet clover between rows of Royal flax in University seed plots, Saskatoon, Sask. (T.C. Vanterpool).

ROOT ROT (Phytophthora Cactorum) caused the death of a few to about 5% of the plants found in 6 out of 10 fields examined in southern Alta. It also caused slight damage in the plots at Saskatoon, Sask. (M.W. Cormack).

LEAF SPOT (Pseudopeziza Meliloti). A moderate infection was found in the lower leaves of most of the plants in a field at Rosemary, Alta. (M.W. Cormack).

FOOT ROT (Rhizoctonia Solani). Some varieties were almost wiped out at Brandon, Man. (W. Cherewick).

BROOM-CORN MILLET

ROOT ROT (Pythium arrhenomanes and P. spp.) was found causing moderate damage in the field at Ardath, Saskatoon, and Outlook, Sask. It caused a pronounced yellowing especially of the outer leaves and stunting of the entire plant in large areas. Necrotic lesions were formed on the roots. Although the susceptibility of millet to Pythium had been demonstrated experimentally in the greenhouse, this is the first report of its occurrence in the field in Sask. (T.C. Vanterpool).

SMUT (Sphacelotheca Panici-miliacei). An estimated infection of 10% of the heads was found in a field at Ardath, Sask., 50% at Outlook, and "19% were affected in my own plots at Saskatoon" (T.C. Vanterpool). This smut was sent in from Assiniboia; it was suspected as the cause of sickness in horses (H.W. Mead). In a field at Oak Bluff, Man., 25% of the heads were affected (W. Popp).

BUCKWHEAT

YELLOWS (Callistephus virus 1) was common in York, Sunbury, Queens, Carleton, Westmorland and Kings Counties, N.B. Infection ranged from one to 20%

in the rough Fagopyron tataricum varieties and a trace in the smooth ones of F. esculentum (D.J. MacLeod). An occasional plant was affected in a field of Silver Hull in Queens Co., P.E.I. (R.R. Hurst).

CORN

EAR, STALK and ROOT ROTS (Diplodia Zeae, Fusarium moniliforme, Gibberella Saubinetii, Nigrospora sphaerica). On open-pollinated varieties, D. Zeae was the only important ear-rot pathogen in seed corn in Essex and Kent Counties, Ont. Damage was most severe in fields where air circulation was poor. Damage from the 3 other fungi mentioned above was localized in both open-pollinated and hybrid varieties. Root rots were unusually widespread and destructive on hybrid varieties in 1942. Damage was almost invariably associated with excessive soil moisture or poor drainage (L.W. Koch).

SMUT (Ustilago Zeae) was reported in Sunbury Co., N.B. and in various parts of P.E.I. Although only traces were present, smut seems to be on the increase in P.E.I.

FLAX

The following account on the "Flax Diseases in Saskatchewan in 1942" was prepared by Professor T.C. Vanterpool, University of Saskatchewan, Saskatoon, Sask.

Flax suffered severely from disease in Saskatchewan in 1942. Several factors appear to be responsible for the rise in severity. Flax growing has expanded to meet the increasing demand on account of the war and production was further stimulated by a Government bonus of two dollars an acre for flax sown on summer-fallowed land. The result has been a sudden substantial increase in the flax acreage. Many farmers with little or no experience in flax growing were induced to sow the crop. In many instances, seed of inferior quality and carrying pathogenic organisms was sown without first being treated with a suitable fungicide. Sometimes the crop was sown on land not sufficiently suited to its culture or on land which had borne a crop attacked by rust or the browning and stem-break disease the previous year. Severe late spring frosts and early fall frosts, both of which were general, resulted in reduced yields. The abnormally high rainfall favoured some diseases, e.g., the browning phase of the browning and stem-break disease, but in general it was favourable for plant growth. Yields of up to 30 bu. per acre on summer-fallow and 22 bu. on stubble were reported for the variety Royal.

Since an increase in the severity and number of diseases affecting flax in the province was anticipated early in the season, progress of the various diseases was followed rather closely and some study was given to the more important phases of their development.

SEEDLING BLIGHT (Rhizoctonia Solani, Pythium de Baryanum, P. megalacanthum and Fusarium Lini) (P.D.S. 12 (1932): 29). Damping-off and seedling blight due to parasitic organisms was not conspicuous this year. Their absence may be attributed to the moderately cool temperatures which prevailed during the early stages of growth and which were probably optimum for flax. Destructive spring

frosts may also have masked seedling blight. Large fields were reported to have been ploughed up because of frost damage and in most localities many thin stands could be attributed to this cause.

RUST (Melampsora Lini) was general over the province. It was most severe on Bison, the most extensively grown variety, but in any one district, the severity of infection on the variety ranged from slight to severe. This was probably due to several factors, such as the presence or absence of bits of rusted straw mixed with the seed, whether overwintered rusted flax straw was present in nearby fields or not, date of sowing, density of stand, soil fertility (H.G. Heggeness, Pl. Physiol. 17: 143-4. 1942), etc. Usually no rust or only a trace was found on Royal. Occasionally in low places or where the stand was thick a moderate infection occurred. When Bison was heavily rusted the sides of the seed were flat or slightly concave instead of convex. Severely rusted fields of Bison near Delisle yielded 9 bu. per acre as compared with fields of Royal, on a farm two miles distant, which yielded 22 and 30 bu. per acre on stubble and fallowed land respectively. On account of susceptibility of Bison to rust, Dominion, Provincial and University agriculturalists have recommended that it be replaced by Royal, in so far as seed of the latter is available, in all parts of the province except in the northern section, where Redwing, on account of its earliness, is still recommended. In September, many samples of Bison attacked by Melampsora Lini revealed a white growth due to a species of Fusarium (cf. A.A. Jaczewski, R.A.M. 8: 381. 1929) on the black telia.

WILT (Fusarium Lini). Early to mid-season wilt was negligible under farm conditions. Only one authentic case of wilt was reported where there was considerable damage; this was a field of Crown on which flax had been grown some years previously. It was very severe on certain varieties in the wilt nursery at Saskatoon, especially in the lower areas.

ROOT ROT (cf. H.H. Flor, Phytopath. 30: 749-760. 1940 and L.W. Boyle, U.S.D.A. Techn. Bull. 458. 1934) appeared as a premature ripening of the plant with shrivelling of the grain and was common in fields of the wilt-resistant varieties Bison and Royal. The disease was a trace to moderate in most fields examined, but it was severe, over 50% of the plants affected, in one field of Bison near Saskatoon and in one near Tessier. Seed from affected plants weighed but 76.6% of that of seed from normal plants in the same field. Fusarium spp., Rhizoctonia Solani, Pythium de Baryanum and Alternaria spp. were the principal organisms isolated. Undoubtedly much of the reduction in yield attributed to rust was due to root rot. The disease is considered next to rust in importance in reducing yields in 1942, with browning and stem-break a close third.

BROWNING and STEM BREAK (Polyspora Lini) in one or both of its phases, was present in severe form on the variety Bison at Delisle, Elbow, Conquest, Bounty, Cudworth and Zelma. Royal was also attacked at Conquest. Letters of inquiry, accompanied by plant samples, were received from these districts; all except Zelma were visited and seed of the 1942 crop was secured later. The disease is much more widespread in the province than was generally realized. It presents a serious problem requiring prompt attention as the causal organism occurs in, as well as on, the seed. While Bison was most frequently affected in the field, probably because it was the most commonly grown variety, the browning phase of the disease in moderately severe form was found here and there on both Redwing and Royal in the University plots. The fibre variety Stormont Cirrus was the one most heavily attacked in the experimental plots. Polyspora Lini was

readily isolated from stem lesions and seed of the four varieties. The organism has also been obtained from all the 1942 seed samples gathered in the districts listed above. The considerable loss caused by this disease has possibly been attributed in part to rust.

ANTHRACNOSE or SEEDLING BLIGHT (Colletotrichum Lini). Light infections of anthracnose were found on the leaves of Bison, Redwing and Royal in the University plots, but later the seed-bolls did not become infected. Pure cultures were obtained from the leaves of Bison. As the organism is carried within the seed, it is highly probable that it is also present in other parts of Saskatchewan, but whether its scarcity is due to the resistance of the commercial varieties of flax grown in the province or to environmental conditions adverse to its development, is not definitely known. The leaves of Bolley's Golden were heavily infected in the experimental plots and later over 50% of the bolls became affected. C. Lini was readily isolated in pure culture from affected seeds. A high percentage of affected seed, which yielded C. Lini when cultured, was present in samples of Liral Crown, Liral Dominion, Stormont Cirrus and J.W.S. varieties grown in the plots at Star City. No isolates of the fungus have been obtained as yet from plating seed of Bison, Redwing or Royal. This disease has not hitherto been reported from Saskatchewan.

HEAT CANKER. No specimens of heat canker were found during the summer which was cool and wet. This is in striking contrast to its general prevalence during the summer of 1941, when high temperatures were common.

FALL-FROST DAMAGE. Flax seed-bolls recently injured by frost appear water-soaked. If the seed is approaching maturity, it is discoloured, turning dark brown to almost black, often with a maroon tinge. The germination is slightly to severely affected. Seed damaged by frost in the earlier stages of maturity range from grey to almost black, usually accompanied by shrivelling and wrinkling of the epidermis. Germination is seriously reduced. Frost damage was general this fall and is the major cause of the low germination and high dockage of much of this year's crop.

Besides the diseases already reported, the following organisms have been isolated:

(i) From diseased seed:

Alternaria spp., common on all varieties; [x]bacteria undetermined (?Pseudomonas atrofaciens cf. P.D.S. 19: 30); [x]Botrytis of the cinerea type, from Bolley's Golden, but not observed in the field (cf. G.H. Pethybridge, H.A. Lafferty and J.G. Rhynehart, Journ. Dept. Agr. & Techn. Instr. for Ireland 21: 167-187. 1921, and B.R. Houston, U.S.D.A. Pl. Dis. Reporter 24: 213-4. 1940); Fusarium spp.; [x]Helminthosporium sativum, isolated from variety J.W.S.; Phoma spp., from Bison, Bolley's Golden and perennial garden flax (Linum perenne), but not observed in the field on the oil varieties (cf. Pethybridge et al. l.c.); ?[x]Sclerotinia sclerotiorum (cf. Pethybridge et al. l.c.), not observed in the field.

(ii) From roots, base of stem or seedlings:

[x]Alternaria spp.; [x]Ascomycete, undetermined; [x]Epicoccum purpurascens; [x]Phoma sp. (cf. Pethybridge et al. l.c.); Pythium de Baryanum; [x]P. megalacanthum; Rhizoctonia Solani; Fusarium spp.

The organisms marked by (x) have not been previously recorded in Saskatchewan. Their importance and distribution in the province are unknown. It should be noted that no specimens of the pasmo disease (Septoria linicola) have been found. 1/

Conclusions: Studies of the seed crop available for 1943 show that Polyspora Lini is present in widely separated parts of Saskatchewan and that it is being carried in the seed in greater amounts than usual, as a result of the wet season in 1942. To this must be added a number of other seed-borne pathogens whose importance and distribution in the province are unknown. Besides the unusual amount of frost-damaged seed, it is likely that there is still considerable cracking of the seed coat of the type reported by J.E. Machacek and A.W. Brown (Phytopath. 32: 733-734. 1942). If seed treatment with suitable fungicides has been deemed necessary in the past, the need for treating the 1942 Saskatchewan-grown seed is considerably greater. Thorough cleaning of the seed to remove, as far as possible, shrivelled and badly diseased seed is necessary before the seed is treated.

As already mentioned, it has been recommended that Royal replace Bison in the south and central districts on account of the greater rust-resistance of Royal, while Redwing is still recommended for the northern park belt.

Other Observations

HEAD DISCOLORATION (Alternaria sp.) was general and moderate at Winnipeg, Man., but it was more pronounced on some varieties than others. The discoloration was dark brown, mostly on the tops of the plants. Alternaria sp. was very commonly associated (J.E. Machacek et al.).

Asterocystis radicis was found on roots of Royal growing in the greenhouse, Saskatoon, Sask., in soil collected from a flax field in the summer of 1942 (T.C. Vanterpool).

SEEDLING BLIGHT (Colletotrichum Lini). The organism was isolated repeatedly from seed of fibre flax from St. Adalbert, Que., and seed of unknown origin. It has not been previously detected in Que. (A. Payette).

WILT (Fusarium Lini) was fairly common in Sask. A moderate infection was found at Young, causing a 10% loss. It was also present on Crown flax from Cantuar, Sask. (H.W. Mead). A light to moderate general infection occurred in Crown at Winnipeg, Man., with more severe infection in large patches. Some 20% of plants were affected in a field at Niverville (W.L. Gordon). Wilt was present in susceptible varieties at Ont. Agr. College, Guelph, Ont. (J.D. MacLachlan). Wilt was observed in fields in Glengarry Co. It occurred in scattered isolated patches, but they were conspicuous enough to attract the attention of the growers (J.E. Howitt).

STEM CANKER (Fusarium spp.) occurred in rapidly spreading patches in flax. It was always associated with rust infection. The fungus begins in the

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1/ As Prof. Vanterpool pointed out to me, the perfect stage of the organism is Sphaerella Linorum Wr. described by H.W. Wollenweber (Rev. Bot. Inst. 'Miguel Lillo' 2(2a): 483-494. 1938. Abstract in R.A.M. 18: 111-2. 1939) from material collected in South America. (I.L. Conners)

rust pustules and spreads out often girdling the stem. F. Scirpi var. acuminatum and F. Equiseti were isolated from material collected in Man. and F. avenaceum from specimens collected at Spalding Sask., by Dr. P.M. Simmonds (J.E. Machacek and W.L. Gordon).

ROOT ROT (Fusarium spp.). In a field of the fibre flax Liral Dominion, at Ottawa, Ont., the plants were dead or nearly so in quite extensive patches representing 10% of the area on Aug. 10. The worst spots appeared to be on slopes exposed to considerable water erosion in the spring, but over most of the field scattered plants were affected. Flax had not been grown on the farm for at least 10 years. The previous crop had been oats. At first this was thought to be wilt, for Fusarium oxysporum was isolated by Dr. W.L. Gordon from the stem bases of samples of diseased plants, while only one isolation was obtained from bases of healthy plants. F. scirpi var acuminatum was also isolated a few times, chiefly from the diseased plants. However, the disease looked more like a root rot, since it did not show up until the crop was approaching maturity (I.L. Conners).

RUST (Melampsora Lini) was unusually prevalent especially in southern Alta. and apparently caused slight damage in a few fields. Infection was a trace in 8 fields, slight in 4 and moderate in 3 out of 17 examined. Infection was slight in the plots at Edmonton, absent to moderate at Lacombe, absent to severe at Lethbridge and it was also reported from Grande Prairie (M.W. Cormack). Rust was moderate to severe on Bison and Redwing and light on Royal in Sask. In many fields no rust developed on Royal. The loss from rust was considerable in some districts, if susceptible varieties were grown (H.W. Mead).

Rust occurred in epidemic form in many localities in Man. in 1942. The first infections were observed on June 23, and by mid-July infections ranging upwards of 80% were present in some fields. The rust infection was not uniformly distributed. Although present in all fields examined, the rust varied greatly in intensity from field to field. Fields of flax in which the rust infection averaged 80% or more were, in some instances, located only a few miles from fields of the same variety which carried infections of only 5% or less. The very uneven distribution of the rust indicated very strongly that the spores initiating the infections were of local origin, for infections caused by wind-borne spores, as is the case in epidemics of leaf and stem rust of cereals, are usually fairly uniformly distributed over very large areas, when the source of initial inoculum is derived from a distant source. Heavily infected fields, in some instances, were found to be located very close or adjacent to fields on which flax was produced last year. Some of the most severely affected were adjacent to fields on which the flax had been harvested by the combine method. This method permits the straw to be scattered over the whole surface of the field, where it often remains undisturbed until the following year.

Of the two varieties, Bison and Redwing, which are the most commonly grown varieties in Man., Bison was the more susceptible. The heaviest infections observed on Bison exceeded 80% while infections in excess of 35% were nowhere observed on Redwing. The variety, Royal, was observed in several experimental plots at Winnipeg, and appeared to be quite resistant under field conditions. The infection on this variety averaged about 7% (B. Peturson).

Rust was present on some varieties at the Ont. Agr. College, Guelph, Ont. (J.D. MacLachlan).

BROWNING and STEM BREAK (Polyspora Lini) was present along with rust on most samples received from Sask. points. It was collected at Kyle, Viscount, Dinsmore and Sovereign. There were indications that it was fairly general in distribution and did considerable damage (H.W. Mead). Stem break caused slight damage on several varieties in the plots at Macdonald College, Que. Its identity was confirmed by plating out the pathogen (R.A. Ludwig). Stem break was rather destructive on Liral Dominion at the Station, Charlottetown, P.E.I. (R.R. Hurst).

SEEDLING BLIGHT (Rhizoctonia Solani). Diseased specimens were received from Zealandia, Sask. (H.W. Mead).

PASMO (Septoria linicola). Infection was moderate at Morden, Man., and slight on one variety at Winnipeg. Material collected at Morden by Dr. C.H. Goulden was examined (W.L. Gordon).

HAIL caused heavy damage in some flax fields in Sask. (H.W. Mead).

FOXTAIL MILLET

ROOT ROT (Pythium arrhenomanes and P. spp.) caused a trace of damage to foxtail millet in my experimental plots at Saskatoon, Sask. Isolations were made from necrotic lesions on the roots. This is the first time the disease has been observed in the field in Sask. (T.C. Vanterpool).

SMUT (Ustilago Crameri) affected 7.6% of the heads in the untreated control in my plots at Saskatoon, Sask. Affected heads appear bleached compared with healthy heads before the crop has reached maturity. The seed was obtained from the Seed Laboratory, Plant Products Division, Saskatoon (T.C. Vanterpool). This smut has been detected previously in Canada in seed samples only. Cf. P.D.S. 20:24. (I.L. Conners).

KOK-SAGHYZ

CROWN GALL (Agrobacterium tumefaciens (Sm. & Towns.) Conn. Journ. Bact. 44: 359. 1942; Bacterium tumefaciens Smith & Townsend, Science ser. 2, 25: 671. 1907; cf. Starr et al. Phytopath. 33: 316. 1943). One specimen from the plot in the Division of Horticulture experimental area, Ottawa, was examined Oct. 30 (L.T. Richardson).

CROWN ROT (Erwinia carotovora). Two specimens of kok-saghyz (Taraxacum kok-saghyz Rodin) affected by crown rot were received from Lethbridge, Alta., Nov. 31 (L.T. Richardson).

BACTERIAL LEAF SPOT (Xanthomonas sp.) was observed at Winnipeg, Man., on kok-saghyz in late summer of 1942. The causal organism has been isolated and its pathogenicity demonstrated by artificial inoculations (W.A.F. Hagborg).

MANGEL

CROWN GALL (Agrobacterium tumefaciens; cf. synonymy p. 27) affected the occasional root in many fields throughout P.E.I. (R.R. Hurst).

LEAF SPOT (Cercospora beticola). Severe in many fields in south-western Ont., where it caused considerable defoliation particularly about Galt (J.K. Richardson); very prevalent in the Guelph district (J.D. MacLachlan); infection generally heavy and damage severe in P.E.I. (R.R. Hurst).

ROOT KNOT (Heterodera marioni) was fairly general in a plot at the University, Vancouver, B.C., causing swellings on fibrous roots of various sizes. It had no apparent effect on yield (W. Jones).

LEAF SPOT (Phoma Betae) was present on the leaves of 60% of the plants being grown for seed at Grank Forks, B.C. (G.E. Woolliams).

STORAGE ROT (Rhizopus sp.) affected a few roots in Jan., 1942, at Duncan, B.C. Rhizopus was isolated from the diseased tissues (W. Jones).

CRINKLE (virus). A trace was found in two fields in York and Carleton Counties, N.B. The affected plants were dwarfed and the younger leaves were severely crinkled and curled (D.J. MacLeod). Crinkle was found occasionally in Queens Co., P.E.I. (R.R. Hurst).

MOSAIC (virus). Ten per cent of the plants affected in a plot grown for seed at the University, Vancouver, B.C. (W. Jones); 15% of plants affected in two fields of stecklings at Verchères, Que.; about 25% of the mother beets were affected in one at St. Hilaire; the diseased plants produced few or no seed stalks (E. Lavallée); a trace in a seed plot in York Co. and in a field in Sunbury Co., N.B. (D.J. MacLeod); occasionally in some fields in Queens Co., P.E.I. (R.R. Hurst).

BLACK HEART (boron deficiency). An affected specimen was brought in from Arnprior, Ont. The central or heart leaves were drying and the heart was rotting from the top downwards. Brown transverse cracks also occurred on the leaf petioles (H.N. Racicot).

DAMPING-OFF (cause undetermined). One 2½ acre field was completely destroyed at Farnham, Que. (E. Lavallée).

FASCIATION. A trace was found in 11 seed plots in Queens, Sunbury, York, and Carleton Counties, N.B. In some plants the entire stem was flattened and was 2-3" in width (D.J. MacLeod and S.F. Clarkson).

RAPE

BLACK ROT (Xanthomonas campestris (Pamm.) Dowson, Zentralbl. f. Bakt. u.s.w. Abt. 2, 100: 190. 1939; Bacillus campestris Pammel, Iowa Agr. Exp. Sta. Bull. 27: 130. 1895; Starr & Burkh. Phytopath. 32: 600. 1942) was present as a leaf infection in the Guelph district, Ont., especially where rape was in close proximity to a turnip field, in which black rot was prevalent (J.D. MacLachlan).

SAFFLOWER

RUST (Puccinia Carthami Corda). A trace of rust was observed on safflower (Carthamus tinctorius) in the plots of the Dominion Forage Crops Laboratory, Saskatoon, Sask. on August 15. Varietal differences were apparent (T.C. Vanterpool

Infection was light to moderate on several lines or varieties in the above plots on September 9 (12016). Spores were present in the washings of the seed of 8 of the 13 lines sown in 1942 at Saskatoon. Five lines, all carrying spores, were from Indian Head, 5, with trace on one, from Ottawa and 3, all clean, from Lethbridge, Alta. After the plots were harvested, seed was examined and spores were found on all varieties (R.C. Russell). The rust was first recorded at Morden, Man., on July 28 by W.E. Sackston (12017). The severity of infection on the same plants was estimated by B. Peturson to be 20% on Aug. 26. No rust was found on safflower in the plots at Winnipeg (W.L. Gordon). No rust was found in plots at Lethbridge, Alta., according to Dr. M.W. Cormack nor were spores found on seed of the 1942 crop examined by me. The rusts of safflower, their hosts and distribution have been studied and the results have been incorporated into a paper for publication in Phytopathology (I.L. Conners).

SORGHUM

LEAF SPOT (undetermined) was present at Saskatoon, Sask. Three attempts to isolate a causal organism failed. (T.C. Vanterpool).

SOY BEAN

LEAF SPOT (Ascochyta sp.) very slightly infected soy beans at Agassiz, B.C., in July. The spots were few, circular to elongate, light brown with a purplish or dark brown border, 2-10 mm. in diameter. The spots often drop out, giving a shot-hole appearance to the leaf. Pycnidia are immersed, light brown, 100-150 microns in diameter; spores hyaline, usually constricted at the septum, 7-12 x 3-4 microns (W. Jones).

ANTHRACNOSE (Colletotrichum Glycines Hori). During September, an extensive survey of soy bean plantings was carried out in Essex Co., Ont. Several diseases were encountered in fields grown both from registered seed and from that obtained from commercial sources. Anthracnose was found a few times affecting stems of plants. Numerous black ascervali were noted scattered uniformly over the surface of the affected tissue. The fungus agreed microscopically with the description of C. Glycines (L.W. Koch and A.A. Hildebrand). S.G. Lehman and F.A. Wolf (Journ. Agr. Res. 33: 381-390. 1926) have found the perfect stage in nature as well as obtaining it in culture and named it Glomerella Glycines.

POD and STEM BLIGHT (Diaporthe Phaseolorum (Cke. & Ell.) Sacc. var. Sojae (Lehm) Wehmeyer). During the summer of 1941, plants within an area of some 400-500 sq. ft. were almost completely destroyed in a planting of soy beans at the Station, Harrow, Ont. The symptoms of the disease were identical with Pod and Stem Blight as described by S.G. Lehman (Ann. Mo. Bot. Gard. 10: 119-169. 1923). Over 90% of the isolations from typically diseased plants yielded pure cultures of either the Phomopsis stage or the Diaporthe.

In 1942, the disease was found again not only in different plantings at the Station, including those of foundation stock intended for registration, but also to a greater or less extent in every field inspected during the county-wide survey. On account of its widespread occurrence and destructiveness this disease must be regarded as the most important affecting soy bean culture in this part of Ont. The disease has not been previously reported in Canada. (L.W. Koch and

A.A. Hildebrand). Lehman described the fungus as Diaporthe Sojae. L.E. Wehmeyer (The genus Diaporthe etc. pp. 47-48. 1933) doubts whether it is distinct from D. Phaseolorum, but he maintained it as a variety of the latter (I.L. Conners).

WILT (Fusarium oxysporum Schl. f. ?tracheiphilum Snyder & Hansen) caused as much damage and occurred almost as widely in Essex Co., Ont., as Pod and Stem Blight. In affected plants, the roots and base of the stem become brown with a browning of the vascular system. In advanced stages the pathogen produces masses of salmon-coloured spores visible to the unaided eye on the stems and lower branches. Frequently branches are attacked at the point where they join the main stem, wilt and give to the stem a "spur-blight" effect (L.W. Koch and A.A. Hildebrand).

DOWNY MILDEW (Peronospora manshurica). Infection was slight on Pagoda, Richland, Minsoy; very slight on Harbora; trace on Mandarin; and nil on Kabatt at Matsqui, B.C. This is the first report of the disease in B.C. (W. Jones). Infection ranged from a trace to severe in Essex Co., Ont., but in general damage was slight (L.W. Koch and A.A. Hildebrand).

BACTERIAL BLIGHT (Pseudomonas glycinea Coerper, Journ. Agr. Res. 18: 188. 1919; Bacterium glycineum Coerper l.c.; cf. Starr & Burkh. Phytopath. 32: 601. 1942) slightly affected a few plants at Agassiz, B.C. (W. Jones). The leaves were infected on 90% of the plants of Manitoba Brown in a field being grown for seed at Grand Forks (G.E. Woolliams). Infection ranged from slight to moderate in most of the plantings at Brooks and Lethbridge, Alta., including several fields of Pagoda and Kabatt. At Olds, infection was moderate on Manitoba Brown and slight on other varieties (M.W. Cormack). Bacterial blight caused slight damage in a private garden at Saskatoon, in the University plots and at Codette, Sask. (T.C. Vanterpool and H.W. Mead). The organism was isolated from soy beans from Aylsham, Sask. Infection was moderate at Otterburne, Ste. Adolphe and Union Point, Man.; severe on Sioux, but trace to moderate on other varieties at Morden. The organism was isolated in each case and appeared typical (W.A.F. Hagborg). In marked contrast to 1941, infection was light, only a trace of the disease being found in a few fields in Essex Co., Ont. (L.W. Koch and A.A. Hildebrand). Infection was trace to slight on Early Black Eye at Ste. Anne de la Pocatière, Que. (R.O. Lachance).

MOSAIC (virus) caused slight damage in the University plots, Saskatoon, Sask. (T.C. Vanterpool). Mosaic infection was general and ranged from slight to severe in the Station plots at Harrow, Ont., including those being grown as foundation stock for registration and in most of the fields inspected in Essex Co. In the aggregate, infection was more severe in fields planted with non-registered seed (L.W. Koch and A.A. Hildebrand). A trace of mosaic (Medicago virus 2) was found in a plot at the Station, Fredericton, N.B. (D.J. MacLeod).

LOSSES FROM DISEASE. In 1942, some 7535 acres of soy beans valued at $300,000 were grown in Essex Co., Ontario. Reduction in yield due to the incidence of disease is conservatively estimated at almost 6%, i.e. $18,000. If the losses due to disease in adjacent counties approximated those in Essex, the loss was about $80,000, for the crop in Southwestern Ont. was worth some $1,315,000.

As suggested by and under the supervision of the Harrow Laboratory, the Experimental Station has undertaken a programme of disease control involving careful roguing and complete destruction of diseased plants in an effort to eliminate all seed-borne diseases from foundation and other plots (L.W. Koch and A.A. Hildebrand).

SUGAR BEET

The following discussion on "Diseases of Sugar Beets in Southwestern Ontario in 1942" was contributed by Dr. A.A. Hildebrand, Dominion Laboratory of Plant Pathology, Harrow, Ont.

CERCOSPORA LEAF SPOT (C. beticola), as usual, was present on sugar beets throughout almost the whole area. Environmental conditions were more conducive to early infection this year than last and during late August the disease must have caused serious loss through defoliation of plants.

Due to unfavourable conditions in the spring, seeding operations this year were spread over a much longer period than usual. As a consequence, in August when Cercospora inoculum was abundant, fields of beets differed widely as to their stage of development. It was noted repeatedly that Cercospora infection was more severe on the early planted, hence more mature beets, than on the later planted ones. Since stomatal movement is greater on mature than on younger leaves, and since infection by Cercospora is favoured by greater stomatal movement (V.W. Pool, and M.B. McKay, Journ. Agr. Res., 5: 1011-1038. 1916), it may readily be understood why earlier planted beets were heavily infected while younger plantings in close proximity remained virtually free from the disease.

PHOMA LEAF SPOT (P. Betae) occurred throughout the area on commercial beets, infection for the most part being confined to the older, lower leaves. The disease persisted much later this year than last, surprisingly heavy infection being noted as late as Sept. 7.

PHOMA SEED-HEAD INJURY. On July 9, in a field of seed-producing plants, it was noted that many of the seed-heads showed an apparently diseased condition. Some of the seeds of affected heads were already dead or showed a reddish to brownish discoloration. The small leaves, also the stalks of the seed heads, were "peppered" with small spots, grayish towards the centre and surrounded by reddish halo. On July 10, in attempt to isolate a possible causal organism, tissue plantings from affected leaves, stalks and seeds (previously surface-sterilized) were made on acidified and non-acidified potato-dextrose agar. In three days' time each planting yielded a culture of Alternaria and in another three days, Phoma also developed from every one of the plantings. Each of the organisms was obtained in pure culture and its pathogenecity was tested on healthy seed-heads in both field and greenhouse infection experiments. Phoma possessed marked pathogenic capability and readily produced symptoms identical with those observed under natural field conditions. While Alternaria did possess some slight pathogenic capability, the symptoms produced differed from those observed in the field.

While it has been known for a long time that Phoma is carried on sugar beet seed, it has not been known so definitely how the seed became infected. The observations recorded above furnish definite information in this regard.

RHIZOCTONIA ROT (R. Solani type). First becoming noticeable about July 9 and later reaching a peak during the first two weeks in August, Rhizoctonia rot was general in its occurrence throughout Essex, Kent and Lambton counties. In some instances as high as 20% of the plants in a field showed infection but, in the aggregate, it is estimated that the disease was responsible for a reduction in yield of about 5% of the crop. Two different types of infection appear to be associated with this disease. In the first, the fungus attacks the plants

at the ground level and infection, spreading upward, kills the base of the leaf petiole and downwards through the crown, affects the upper part of the root. Affected plants in a row may be readily recognized by the rosette of recumbent leaves, the petioles of which show a more or less extensive brownish discoloration near their point of attachment to the crown. When harvested the crown and upper part of affected roots may be completely rotted while the lower portion of the tap root may remain almost unaffected. In the second type of infection, the fungus attacks the root at some distance below the crown. Affected roots show more or less extensive brownish-discolored lesions. These are relatively shallow but deep fissures are also formed. In the latter are often visible brownish-coloured wefts of the coarse mycelium of the fungus. In the hot days of midsummer the leaves of affected plants may wilt but they do not necessarily die. As autumn approaches the above-ground parts of affected plants may be quite normal in appearance and give no indication of a diseased condition of the roots. When harvested, the lower part of the tap root of affected plants may be more or less completely rotted while the crown remains intact. Whether the symptoms described above represent two distinct types of disease caused by different strains of Rhizoctonia or whether they are merely different manifestations of the same disease caused by a single strain of the fungus are points which remain to be investigated.

RHIZOPUS ROT. In July, sugar beets growing in an experimental plot at the Harrow Laboratory exhibited a wilted condition. Examination of the roots of affected plants revealed the presence of a type of rot which had not previously been encountered in Ontario. Isolations from infected roots yielded repeatedly Rhizopus arrhizus Fischer in pure culture to the extent of almost 100 per cent. In field infection experiments, R. arrhizus was found capable of reproducing the disease on artificially injured but otherwise healthy plants exactly as it had been originally found under natural field conditions. Since 1915, when H.A. Edson (Journ. Agr. Res. 4: 135-168. 1915) described this disease as occurring to a limited extent in California and Colorado, it does not seem to have been encountered elsewhere on this host in North America.

SAVOY (virus). From July 9 until the end of the growing season savoy-infected plants were noted throughout the district. In not a single instance, however, were infected plants numerous enough to attract more than passing interest.

VIRUS-LIKE DISEASES. This season, as was the case last year, many plants were noted, the foliage of which exhibited symptoms strongly suggestive of the presence of virus. In the early part of the growing season the leaves of many plants showed a fine mottle which seemed to be similar to that described for mosaic-infected plants, except that, unlike mosaic, the mottle never appeared in the youngest leaves. It was observed that thrips were present on many of the mottled leaves and that later in the season, when thrips could no longer be found in sugar beet fields, the mottle did not appear on the later-produced leaves. There is, however, a coarse mottle which does persist throughout the season. Attempts to date to transmit the trouble from affected to healthy plants both by insect transfer and by patch grafts have been unsuccessful. The trouble may be of the nature of a nutritional disorder.

BLACK ROOT or DAMPING-OFF (cause undetermined). From May 28 until almost June 20, black root of seedlings constituted a more serious threat to the sugar beet crop than it has for a number of years past. Because of the severity

of the disease, many fields had to be resown either to sugar beets or more often to other crops and in many affected fields which were retained the effect of the disease was reflected later in reduction in yield and quality of beets. It was especially difficult this year to evaluate even approximately the losses due to black root since water damage following excessive rains, and delayed thinning and weeding due to acute labour shortage, were complicating factors.

Other Observations

LEAF SPOT (Cercospora beticola) caused considerable damage to the foliage in one field at Agassiz, B.C., in July. Infection was general and damage slight on Vancouver Island and the lower mainland in Aug. (W. Jones)

ROOT-KNOT NEMATODE (Heterodera marioni (Cornu, 1879) Goodey, 1932) is very prevalent in the Blackwell district, near Sarnia, Ont., but it was very much less in evidence in sugar beets in 1942 than it was in 1940 and 1941. (A.D. Baker)

SUGAR-BEET NEMATODE (Heterodera schachtii Schm.). In the Blackwell district, lying to the east of Sarnia, Ont., a precautionary area has been established against the sugar beet nematode embracing all the infested areas of this district. There have been put into effect, through the Ontario Department of Agriculture, regulations which govern the growing and harvesting of all sugar beets in the district. To date, a total of 18 infested fields have been definitely located. No further infestation has been found at Glencoe, where one infested field was found in 1931. The above constitute the only definite records of distribution in Canada. While bare spots have been evident from time to time in some infested fields at Blackwell, the injury cannot yet be classified as severe, possibly due to the early adoption of precautionary measures. (A.D. Baker)

LEAF SPOT (Ramularia beticola) was general in seed crops on Vancouver Island and the lower mainland, B.C. It caused considerable damage to the leaves in crops being grown for seed, and it also affected the stems.(W. Jones)

MOSAIC (virus) affected about 12% of the mother plants in 2 fields of Frontenac, being grown for production of registered seed at St. Hilaire, Que. (R.O. Lachance)

HEART and CROWN ROT (boron deficiency) slightly affected a field of Frontenac at Joliette, Que., and a second at St. Hilaire (R.O. Lachance)

HOLLOW HEART (cause unknown). Three severely affected fields showing 30-40% of the roots variously injured were found in Que., at Joliette, Verchères and St. Hilaire respectively. Stem cracking was found associated with the hollow heart. (E. Lavallée)

SUNFLOWER

RUST (Puccinia Helianthi). Both aecia and uredinia were found at Saskatoon, Sask. Rust was not as severe as usual in the extensive sunflower breeding plots of the Dominion Forage Crops Laboratory (T.C. Vanterpool). Rust was moderate on several varieties at Winnipeg, Man.

WILT (Sclerotinia sclerotiorum). About half the plants of Mammoth Russian were dying and many others were infected in the continuous sunflower plot at Lacombe, Alta. No infection was found in an adjoining field of the variety Sunrise (M.W. Cormack). Wilt was first observed in the plots at Saskatoon, Sask., on Aug. 12, when sclerotia were already present. Plants were attacked at the base or higher up the stem and in the head. According to Mr. E.D. Putt, the disease was severe at the Melfort Station and the Mennonite varieties are susceptible (T.C. Vanterpool). Affected plants were received from the Scott Station; damage was moderate. (H.W. Mead)

LEAF SPOT (Septoria Helianthi) infection was moderate to severe on material received from Melita, Man. (W.L. Gordon)

CULTIVATED GRASSES

AWNLESS BROME GRASS (Bromus inermis)

Ergot (Claviceps purpurea). Infection severe in a field at Cardston, Alta., and moderate to severe in many roadside stands throughout the province; moderate infection at Winnipeg, Man.

Other records of ergot were: on Alopecurus aequalis collected by A.E. Roland and W.C. Dore on top of Cape Blomidon, N.S. on Sept. 2 (R.H. Lewis); on Agropyron repens at Porter Point, Kings Co., N.S. (R.H. Lewis); severe on grasses in Sask., especially common on those along the roadways including Agropyron repens and Stipa viridula (T.C. Vanterpool); on Bromus sp. growing alongside a field of barley at Grand Forks, B.C. (G.E. Woolliams); on Elymus glaucus in scattered spots near Sidney, B.C. (W. Jones)

Leaf Spot (Selenophoma bromigena) infection was in general moderate in Sask., although at Radisson it was severe. Distinct differences in the severity of infection were noticeable on the various lines being grown at Saskatoon. (H.W. Mead)

BROWN TOP (Agrostis tenuis)

Grass Nematode (Anguina agrostis) (Steinbuch, 1799) Filipjev, 1936) was identified from plants of A. tenuis and Poa pratensis submitted by W.G. Dore who collected them near Yarmouth, Granville Ferry, and Grand Pré, N.S. (A.D. Baker)

CANADA BLUE (Poa compressa)

Powdery Mildew (Erysiphe graminis) slightly affected P. compressa and P. pratensis in the greenhouses, Dominion Forage Crops Laboratory, Saskatoon, Sask. No mildew was observed on brome, crested wheat grass, timothy and sheep fescue growing in pots on the same bench. (T.C. Vanterpool)

CRESTED WHEAT GRASS (Agropyron cristatum)

Ergot (Claviceps purpurea). A trace was present at Saskatoon, Sask., in a park (P.M. Simmonds) and in the plots of the Forage Crops Laboratory. (T.C. Vanterpool)

ORCHARD GRASS (Dactylis glomerata)

Stem Rust (Puccinia graminis). Moderate infection on O.A.C. 1 at Morden, Man.

Smut (Ustilago striiformis) affected heads of several plants at Elora, Ont. (MC 1016); it was also collected on this host (MC 1025), Phleum pratense

(MC 1026) and Agrostis stolonifera (MC 1027) at Macdonald College, Que. (I.H. Crowell)

TALL OAT GRASS (Arrhenatherum elatius)

Brown Stripe (Scoletotrichum graminis) was general and caused slight damage in the trial rows at Sidney, B.C. It was also common in the area on Elymus glaucus. (W. Jones)

Smut (Ustilago perennans). Slight infection at the Station, Sidney, B.C. (W. Jones)

TIMOTHY (Phleum pratense)

Heterosporium Leaf Spot (H. Phlei). Occasional spots were found at the Botanical Garden, Montreal, Que. (J.E. Jacques). Infection was about 10% on the wild grass and on many clones in the rust nursery, Charlottetown, P.E.I. (R.R. Hurst).

Stem Rust (Puccinia graminis var. Phlei-pratensis). A trace in one field in Alta. and in the plots at Edmonton (H.W. Cormack). It was remarkable that rust was almost entirely absent in places about Macdonald College, Que., where it was abundant in previous years. (I.H. Crowell). Stem rust was unusually common in P.E.I. in 1942; infection ranged from a trace to 100%. (R.R. Hurst)

Smut (Ustilago striiformis) was fairly common in the vicinity of Macdonald College, Que. (I.H. Crowell)

WESTERN RYE GRASS (Agropyron trachycaulum var. typicum)

Smut (Urocystis Agropyri) was observed on this host at Macdonald College, Que. The smut is also locally abundant on Agropyron repens. Ustilago macrospora and U. hypodytes were likewise abundant on A. repens, the latter smut being more widespread than the former. These last two smuts are new records for Que. (I.H. Crowell)

TURF

Snow mould (Fusarium ?nivale). Experiments were conducted on the plots of the Division of Forage Plants in 1940-41 and 1941-42 to determine how snow mould may be most economically controlled either with the mercury compounds now commonly used or preferably by some suitable substitute. Different species and strains of bent grasses differ greatly in their susceptibility to snow mould. Injury of the turf in the past two years was 70-75% for Washington bent, 55-65% for New Brunswick bent and only 15-25% for Colonial bent. However, Washington bent recovered quickly from the attack, but the other two grasses carried the scars of serious snow-mould attack until quite late in summer unless the turf was given special renovation treatment. Chemical treatment for snow mould in the spring of 1941 as soon as possible after the snow disappeared failed to control the disease. Of the materials applied in the fall of 1941 and of 1942, only the mercurials were effective. Semesan, Special Semesan, bichloride of mercury and Paratox all gave excellent control in both years, while calomel was relatively ineffective and oxide of mercury did very little good. Ceresan was tested in the fall of 1941 and although it gave excellent control it also severely injured the turf. The superiority of bichloride of mercury over calomel was also shown in tests containing mixtures of the two. Hydrated lime was wholly ineffective. Other substances which have proved useless as the result of two years' trial, were: Bordeaux mixture, Malachite green, combinations of the two, boron, copper sulphate, silver nitrate, and sulphur. Nomersan, with tetramethyl thiuramdi-

sulphide as the active ingredient, gave variable results, but further trials with the similar Thiosan will be conducted. (J.H. Boyce)

Brown Patch (Rhizoctonia Solani) affected large areas in several greens of the Municipal Golf Course, Montreal, Que. (J.E. Jacques). The disease was reported from 2 lawns in Charlottetown, P.E.I. (R.R. Hurst)

III. DISEASES OF VEGETABLE AND FIELD CROPS

ASPARAGUS

BLIGHT (Alternaria sp.) caused severe defoliation of seedling asparagus plants in one planting in Lincoln Co., Ont., and apparently reduced their growth considerably. An Alternaria was isolated from the affected leaves (J.K. Richardson)

SOFT ROT (Erwinia carotovora). Some bunches from a garden at Charlottetown, P.E.I., developed soft rot. (R.R. Hurst)

RUST (Puccinia Asparagi). A trace to heavy infection was observed on some plants at Morden, Man. (W.L. Gordon); a general slight infection on many farms in the Niagara Peninsula, Ont., but in no instance was severe damage observed (J.K. Richardson); one small field was severely infected in a low place near the river at Rivière des Prairies, Que. (E. Lavallée). Badly infected specimens were received from Napierville. (R.O. Lachance)

BEAN

POD ROT (Botrytis cinerea) slightly infected the pods in the plots at Sackville, N.B. (S.F. Clarkson and J.L. Howatt). It affected 10% of the pods in a plot of Navy beans at Nappan, N.S. (J.F. Hockey)

ANTHRACNOSE (Colletrotichum Lindemuthianum). Diseased specimens received from Langley Prairie, B.C. (L.T. Richardson); infection slight in a few gardens and severe on selections of Pencil Pod Black Wax and Tendergreen in the University plots, Edmonton, Alta. (M.W. Cormack); damage moderate in a home garden at Saskatoon, Sask. (H.W. Mead); severe infection on most varieties, particularly Stringless Green Pod at Brandon, Man. (W.L. Gordon); present on susceptible varieties at Ont. Agr. College, Guelph, Ont. (J.D. MacLachlan); infection general and rather severe in the Niagara Peninsula (J.K. Richardson); reported from all the counties about Montreal, Que. (O. Caron); absent in fields inspected for certification in Que., and a trace on Pencil Pod Black Wax at Ste. Anne de la Pocatière (R.O. Lachance). Little infection was found in the many fields inspected in the Montreal district (E. Lavallée); slight to severe damage in the plots at Fredericton and Sackville, N.B. (S.F. Clarkson and J.L. Howatt); damage a trace to severe on Pencil Pod Black Wax and other varieties throughout P.E.I. (R.R. Hurst)

HALO BLIGHT (Pseudomonas medicaginis Sackett var. phaseolicola (Burkh.) Stapp & Kotte, Nachrichtenbl. d. Deutsch. Pflanzenschutzd. 9:35. 1929; Phytomonas medicaginis (Sack.) Bergey et al. var. phaseolicola Burkholder, Phytopath. 16:922 1926; cf. Dowson, Zentralbl. f. Bakt. u.s.w. Abt. 2, 100:189. 1939, Starr & Burkholder, Phytopath. 32:601. 1942). Affected material received from Calgary, Alta.; due to the severe attack, no pods were set (W.A.F. Hagborg); rather severe in several localities in the Niagara Peninsula, Ont., both in field and garden varieties; bacterial blight (q.v.) may also have been present, but every diseased plant that was observed showed the typical "halo" symptoms on the leaves (J.K. Richardson); common on the varieties at Sackville and Port Elgin, N.B., but not present at Fredericton; damage slight to severe (S.F. Clarkson and J.L. Howatt).

BACTERIAL BLIGHTS (Pseudomonas medicaginis var. phaseolicola and Xanthomonas phaseoli). Blight was unusually prevalent and destructive, particularly in southern Alta., where a number of fields, including a considerable acreage being grown for seed, were either destroyed or severely infected. These fields had been planted with certified seed. Also, the yields of many fields of beans being grown for canning purposes were severely reduced on account of these diseases. Further, severely blighted kitchen garden plots were common throughout Alta. Halo blight appeared to be the more common of the two diseases (M.W. Cormack). The bacterial blights were observed at several points in Man.; infection was moderate at Brandon and Winnipeg; general and severe on some varieties at Morden; severe (halo blight) at Portage la Prairie. P. phaseoli was isolated from one collection at Winnipeg and tested for pathogenicity. The variety plots at Winnipeg became naturally infected by halo blight. The symptoms were typical of halo blight and the pathogen was isolated. Infection on July 27 was severe on R.P. Kidney Wax, Matchless Green Pod and Masterpiece, moderate on Tendergreen and Pencil Pod Wax, slight to moderate on Stringless Green Pod, slight on Improved Golden Wax and a trace on Altoba. (W.A.F. Hagborg)

DAMPING-OFF (Rhizoctonia Solani) was prevalent in Queens Co., P.E.I., in 1942; infection was 1-15% in many gardens but 100% in 6. (R.R. Hurst)

SCLEROTINIA ROT (S. sclerotiorum) caused slight damage through rotting the pods in two gardens at Edmonton, Alta.

RUST (Uromyces appendiculatus) infection was general in a field of Blue Lake pole beans at Hatzic, B.C., and caused moderate damage. (W. Jones)

BACTERIAL BLIGHT (Xanthomonas phaseoli (E.F. Sm.) Dowson, Zentralbl. f. Bakt. Abt. 2, 100: 190. 1939; Bacillus Phaseoli E.F. Smith, Bot. Gaz. 24: 192. 1897; Proc. Am. Assoc. Adv. Sci. 46: 288. 1898; cf. Starr & Burkholder, Phytopath. 32: 600. 1942). A single plant in a row of foundation seed at the Farm, Agassiz, B.C., was observed (W. Jones); lightly affected plants received from Maymont, Sask.; relatively few reports in 1942 (H.W. Mead); caused slight to moderate damage in Sask.; commoner than usual in unwatered gardens (T.C. Vanterpool); present on some varieties at Ont. Agr. College, Guelph, Ont.; (J.D. MacLachlan); prevalent throughout Ont. in 1942; specimens received from widely scattered counties (J.E. Howitt); reported from all the counties about Montreal, Que. (O. Caron); very little disease found in the Montreal district in 41 fields sown with seed coming from clean fields, when present, it occurred in patches; some fields sown with unselected seed were badly affected (E. Lavallée); out of 13 fields of Brittle Wax inspected in the Montreal district 3 were disease free, 4 contained traces, 3 with 3% infection and 3 with 15%, (R.O. Lachance); 10% infection of Round Pod Kidney Wax at L'Assomption (L.T. Richardson); slight to severe in Westmorland Co., N.B. (S.F. Clarkson and J.L. Howatt); infection a trace to 15% in Pencil Pod Black Wax and other varieties in many gardens throughout P.E.I. (R.R. Hurst)

MOSAIC (virus) was rather common in Alberta; infection ranged from 11 to 20% in 4 large fields planted with certified seed in the Taber district. Infection was slight in all varieties at Lethbridge (M.W. Cormack). Mosaic (Phaseolus virus 1) was present on some varieties at the Ont. Agr. College, Guelph, Ont. (J.D. MacLachlan). Mosaic severely affected 90% of the plants of Stringless Refugee Wax in the test plots at Sackville, N.B.; a trace was present in Matchless Green Pod, Improved Golden Wax, Streamliner, Currie's Rust Proof, and

Refugee 1000-1 in the same plots (D.J. MacLeod). Infection ranged from traces to 4% in the wax pod varieties in gardens in Queens Co., P.E.I., but it was 85% in an unknown variety. (R.R. Hurst)

RUSSETING (cause unknown) was quite general on Black Kidney in a garden in Queens Co., P.E.I. (R.R. Hurst)

SCALD (magnesium deficiency) was severe on a number of varieties in the Laboratory plots, Fredericton, N.B. It was common also on bush beans in York, Sunbury, and Westmorland counties. The condition was less in evidence on limed soils. Scald is characterized by rusty brown scalding of the leaves, early defoliation and dwarfing of the plant. Severely affected plants failed to set pods or the pods and seed were poorly developed. (D.J. MacLeod)

SUN SCALD affected about 60% of the plants in a garden at Westboro, Ont., but all the plants would likely recover. (H.N. Racicot)

BEET

SCAB (Actinomyces scabies) infected 10% of the roots of Detroit Dark Red in one garden in Queens Co., P.E.I., and caused moderate damage. Other cases were reported, but the trouble was no greater than usual. (R.R. Hurst)

LEAF SPOT (Ascochyta Betae Prill. & Del.) slightly affected a few leaves at Ryder Lake, B.C. Sometimes the fungus was associated with Phoma. This organism has not been previously reported to the Survey. (W. Jones)

LEAF SPOT (Cercospora beticola). Slight infection in plot of seed beets at Brooks, Alta. (L.E. Tyner); infection general but not sufficiently severe to cause perceptible damage in Lincoln Co., Ont. (J.K. Richardson); slight infection in Laval and Jacques-Cartier counties, Que. (E. Lavallée); infection general, but not severe in a plot of seed beets at Macdonald College (R.A. Ludwig); slight infection at Kentville, N.S. (G.W. Hope); infection 4% in one garden, 40% in another in Queens Co., P.E.I. (R.R. Hurst)

LEAF SPOT (Phoma Betae) was found on the lower mainland, B.C. The pathogen was most prevalent on the lower leaves in crops grown for seed. Misses due to the decay of the bulb, caused in part by this fungus, result in heavy losses. Poor storage and grading are also considered important factors. (W. Jones) Leaf infection was a trace at Brandon and Morden, Man., and slight at Ponemah in root crops, and was heavy on seed beets at Morden. (W.L. Gordon)

RUST (Uromyces Betae) Margaret Newton and B. Peturson (Phytopath. 33: 10. 1943) have recently reported on the temperature requirements of this rust. It was first observed in 1935 at Saanichton and Agassiz, B.C. (P.D.S. 15:25). The seed used was imported from Europe and was carrying a heavy load of uredinio-spores and teliospores. The rust is most severe at Saanichton in the early spring and late fall. The optimum temperature for spore germination is 10-22°C and for rust development, 15-22°C. Varieties susceptible at 15-22°C develop resistance at higher temperatures and become extremely resistant at 26°C. The sensitivity of the rust to high temperatures probably accounts for its absence in the Prairie Provinces, where summer temperatures exceed these values.

BORON DEFICIENCY. A small field of red table beets was a complete failure at St. Roch des Aulnaies, Que. (C. Perrault). Internal breakdown was found on 2 farms in Sunbury and Northumberland counties, N.B., respectively; the damage was severe. (D.J. MacLeod)

BLACK MUSTARD

WHITE RUST (Cystopus candidus). All plants were severely attacked and most of the leaves died prematurely at the Botanical Garden, Montreal, Que. (J.E. Jacques)

BROAD BEAN

BLIGHT (Alternaria sp.) was found at Ste. Anne de la Pocatière, Que. The plants became infected a few weeks after the seedlings emerged. In severe cases, the entire plant turned black. Pods, when formed, were also affected and the mycelium grew inside the pod onto the seeds. (C. Perrault)

MOSAIC (Trifolium virus 1). Two per cent of the plants in the variety plots at Sackville, N.B., showed a conspicuous veinal mottle and malformation of the leaves. (D.J. MacLeod)

STREAK (virus). One per cent of the plants in the same plots at Sackville, N.B., showed a severe streak, veinal mottle and stunting (D.J. MacLeod).

BRUSSELS SPROUTS

RING SPOT (Mycosphaerella brassicicola) moderately infected the leaves in a garden at the Station, Sidney, B.C. (W. Jones)

CABBAGE

BLACK LEAF SPOT (Alternaria circinans). Slightly affected the lower leaves of Flower of Spring at Sidney, B.C.; the disease is widely distributed but seldom does much damage to the foliage (W. Jones); on lower leaves of Penn. State College grown for seed at Maugerville, N.B. (S.F. Clarkson)

GREY LEAF SPOT (Alternaria Brassicae) slightly affected cabbage in one garden at Saskatoon, Sask. (B.J. Sallans)

SOFT ROT (Erwinia carotovora) affected 3 plants at the Station, Charlottetown, P.E.I. (R.R. Hurst)

RING SPOT (Mycosphaerella brassicicola). Slight infection at Sidney and Agassiz, B.C. (W. Jones)

CLUB ROOT (Plasmodiophora Brassicae). Common in Chinese truck gardens in the New Westminster and Vancouver districts, B.C., and causes considerable damage (W. Jones); quite serious in the western part of Que. (O. Caron); many

fields affected at St. Martin and Ste. Dorothée, rate of infection varying with the degree of contamination (E. Lavallée); traces in 4 and severe in one garden about Charlottetown, P.E.I., but probably destructive in others. (R.R. Hurst)

SCLEROTINIA ROT (S. sclerotiorum) caused a trace of damage in home storage under fairly cool conditions at Saskatoon, Sask. (T.C. Vanterpool).

BLACK ROT (Xanthomonas campestris; cf. p. 28) caused 15% damage at St. Laurent, Que. (L.T. Richardson). Reported from 3 storage centres, but not observed in the field in P.E.I. (R.R. Hurst)

VIRUS-LIKE DISEASES. A few plants were affected in Golden Acre grown for seed at the Station, Sidney, B.C. Affected plants were stunted and stems and branches of the inflorescence were distorted. No mottling of the mosaic type was present. (W. Jones)

BROWN HEART (boron deficiency) was reported less frequently than last year because the use of boron is becoming more general (O. Caron); affected 65% of the cabbages in one lot at Macdonald College, Que.; undoubtedly its occurrence was favoured by the dry season. (J.G. Coulson)

CARROT

BLACK ROT (Alternaria radicina). In recent years, black rot was found once at Sidney, B.C., on a field carrot by J.E. Bosher and at New Westminster by W. Jones on a few carrot roots discarded from storage after the winter. In the greenhouse, a seedling blight can be very troublesome at Sidney when the seed sample is carrying a high percentage of A. radicina. It is readily controlled by seed treatment (cf. p. 74). In the field, the disease, either as a seedling blight, leaf spot or root-rot, has not been noted when infected seed was planted. (I. Mounce and J.E. Bosher). The results of these investigations are reported by the authors in Sci. Agr. 23 (7): 421-423. 1943. (I.L. Conners)

Inspection of carrot roots in storage in January, 1943 revealed two lots severely affected by Alternaria radicina. The loss was estimated at 70%. Early in the 1942 season, the fungus was obtained from carrot seedlings affected by a damping-off. During mid-season some foliage spotting was also found with the same fungus in the lesions. More recently a series of seed samples were tested and some samples showed a fairly high infection with A. radicina (J.F. Hockey). The disease was reported in N.B., in 1929. (P.D.S. 9: 27) (I.L. Conners)

SOFT ROT (Erwinia carotovora). Carrot roots showed occasionally soft rot in the early stages when they were lifted from the ground in the Okanagan valley, B.C., in 1942. (G.E. Woolliams) Soft root was affecting all the carrots in one lot in store in March, 1942, in Queens Co., P.E.I., and was causing severe damage. Probably it occurred elsewhere. (R.R. Hurst)

ROOT-KNOT NEMATODE (Heterodera marioni (Cornu, 1879) Goodey, 1932) was found causing injury to carrots in a truck garden at Ottawa, Ont.; and also in carrots received from the Blackwell area near Sarnia. (A.D. Baker)

LEAF BLIGHT (Macrosporium Carotae) was general in 2 fields at Agassiz and Hatzic, B.C., respectively; the damage was slight. (W. Jones)

CROWN ROT (Rhizoctonia Solani) severely affected 10% of the roots in a cellar at Charlottetown, P.E.I.; sclerotia were plentiful. (R.R. Hurst)

SCLEROTINIA ROT (S. sclerotiorum) caused considerable damage in a home storage bin at Indian Head, Sask.; damage by this rot was reported by several growers at Saskatoon. (H.W. Mead) Specimens from two farms at East Florenceville, N.B., were received on Dec. 12. (H.N. Racicot)

BACTERIAL BLIGHT (Xanthomonas carotae (Kendr.) Dowson, Zentralbl. f. Bakt. Abt. 2, 100: 190. 1939, Pseudomonas carotae Kendrick, Journ. Agr. Res. 49: 504. 1934) was general in the Grand Forks district, B.C., in all fields of Chantenay, Imperator and Nantes carrots grown for seed; infection ranged from 10-40% of the plants but in nearly all fields the damage was slight. (G.E. Woolliams) Infection was general and moderate at Brandon, Man., and slight on the odd plant at Morden. (W.L. Gordon)

YELLOWS (? beet curly-top virus) affected 1-3% of the plants in all fields of carrots being grown for seed in the Grand Forks district, B.C. In 1941, tomatoes in this district were severely affected with yellows (curly top virus) (P.D.S. 21: 59). It seems probable that the carrot stecklings became infected in 1941 and the disease showed up in the mother plants this year. Yellows was not observed on tomatoes at Grand Forks this year. (G.E. Woolliams)

YELLOWS (Callistephus virus 1). A trace occurred at Brandon, Man. (W.L. Gordon). A trace was observed at Ste. Anne de la Pocatière, Que. by Dr. H.T. Güssow (R.O. Lachance). Yellows was common in York, Sunbury, Queens, Westmorland, Kings, and Carleton counties, N.B. Infections ranged from 10 to 20% in commercial fields. In a seed plot in York Co., 8% of the plants were affected. Affected seed plants were very chlorotic, severely dwarfed and died early in the season setting no seed. Much of the infection is carried over winter in the stecklings, but the mother plants usually die soon after planting (D.J. MacLeod). Due to the increased acreage of carrots in N.S., the crop and the losses from yellows are of increasing importance. The disease was readily found on weed hosts in the early summer and was noted on carrots about July 20. The insect vector, Macrosteles divisus, was more prevalent this year than in 1941 and was particularly abundant during August and early September. In commercial areas, surveys revealed up to 53% of the plants affected by yellows and an average infection of about 20%. Proximity to pastures or weedy fields and fence and tree rows appears to result in an increase in the incidence of yellows. Carrots showing yellows on 2 to 4 leaves may be harvested for bunching, but if more leaves are affected, the roots will show the "fuzzy root" condition and are unmarketable. Yellows was very prevalent throughout the central and western parts of N.S. on Erigeron canadensis; it was also observed on wild carrot, Daucus Carota, along the roadside in Kings Co. and on a few dandelion plants in a lawn at Kentville (J.F. Hockey). Yellows affected 17% of the Chantenay carrots in the Laboratory plots, Charlottetown, P.E.I., and was apparently troublesome at many other points. (R.R. Hurst)

CAULIFLOWER

ROT (Botrytis cinerea) caused a severe blight and rot of curds in a greenhouse at Kentville, N.S., when the plants were in bloom. (J.F. Hockey)

SOFT ROT (Erwinia carotovora) was fairly general on Vancouver Island

and the lower mainland, B.C., and caused heavy losses in some seed crops. Its spread has been checked somewhat by dusting the plants with copper-lime dust (W. Jones). Soft rot affected about 50% of the cauliflower plants watered by an overhead sprinkler system at Macdonald College, Que., and caused about 5% loss. (J.G. Coulson)

CLUB ROOT (Plasmodiophora Brassicae) affected many fields about St. Martin and Ste. Dorothée, Que. (E. Lavallée). It affected 50% of the plants in a field at St. Martin, and caused considerable damage; no cauliflower or cabbage had been planted in this field for 10 years (L.T. Richardson). Club root was reported in cauliflower by several growers about Charlottetown, P.E.I., but in no case was it very destructive. (R.R. Hurst)

WIRE STEM (Rhizoctonia Solani) is a serious disease commonly found in hot-beds in the Montreal district, Que. Treatment of the soil in the beds with a formaldehyde solution (3/4 qt. of formaldehyde to 5 gal. of water) has given satisfactory control. In fact it has proved much more effective than bichloride of mercury. (E. Lavallée)

WILT (Sclerotinia sclerotiorum) almost completely destroyed ¼ acre of cauliflower being grown for seed at Elk Lake, B.C. The preceding crop of wallflowers had been virtually wiped out. The cauliflower on other areas on the same farm were uninjured. (W. Newton)

BORON DEFICIENCY affected 51% of the cauliflower in a planting at Macdonald College, Que.; the season was abnormally dry (J.G. Coulson). Affected cauliflower were observed on the market at Charlottetown, P.E.I.; 12 other reports were received, but not investigated. (R.R. Hurst)

CELERY

EARLY BLIGHT (Cercospora Apii). As has been the case for the past several years, early blight was a greater problem than late blight on many farms in Lincoln Co., Ont. It is frequently the cause of severe damage before late blight appears (J.K. Richardson). A 2% infection was observed on sprayed celery at St. Martin, Que.; the damage was nil (L.T. Richardson). A 60% infection on the leaves was observed in a planting of Golden Self Blanching in Queens Co., P.E.I. (R.R. Hurst)

DAMPING-OFF (Pythium sp.). A damping-off and root rot was found affecting celery seedlings in Lincoln Co., in March. Spraying with Cuprocide effectively checked the disease. (G.C. Chamberlain)

PINK ROT (Sclerotinia sclerotiorum) severely affected about 20% of the plants in one patch in the Laboratory plots, St. Catharines, Ont. The disease has not been observed in this locality for some years. (J.K. Richardson)

LATE BLIGHT (Septoria Apii-graveolentis) was common on plants for sale by wholesale dealers in Victoria and Vancouver, B.C.; the damage was slight to moderate (W. Jones). Affected specimens were received from Cranbrook, B.C. It was reported that it caused considerable damage there and at Armstrong (G.E. Woolliams). Infection was severe in a truck garden at Lethbridge, Alta. (M.W. Cormack). Moderate infection was observed in a market garden at Saskatoon, Sask.

(H.W. Mead). Late blight was quite severe in the Niagara Peninsula in 1942, and where the plants were not sprayed continuously, it caused considerable damage (J.K. Richardson). Late blight was present, but it was not as severe as usual in Laval Co., Que.; spraying and dusting of beds and fields are practised quite regularly. (E. Lavallée)

MOSAIC (virus). Five plants showing a well-defined veinal mottle and crinkle were found in a garden at Oromocto, N.B.: the virus was identified as Cucumus virus 1 (D.J. MacLeod). Mosaic was found affecting 3 plants in a garden in Queens Co., P.E.I. (R.R. Hurst)

BLACK HEART (cause undetermined) caused a complete loss of a planting of Salt Lake and Golden Self Blanching at the School of Agriculture, Ste. Anne de la Pocatière, Que. (R.O. Lachance)

BORON DEFICIENCY. R.O. Lachance, P. Bertrand and C. Perrault (Sci. Agr. 23 (3): 187-193. 1942) have described a Heart Atrophy of celery due to boron deficiency. The authors consider that it represents an extreme case of boron deficiency. As the soil becomes more deficient in boron, the symptoms on celery are progressively: stem cracking, dwarfing, and heart atrophy (I.L. Conners); some 20% of the plants in a field in Sunbury Co., N.B. showed symptoms of boron deficiency. (D.J. MacLeod)

SOFT or HEART ROT (cause undetermined) caused moderate damage in a market garden at Saskatoon, Sask. The tissues in the heart were in a soft condition. (H.W. Mead)

HEART ROT (cause undetermined) affected all the plants in one storage in Queens Co., P.E.I., and rendered them valueless. (R.R. Hurst)

CUCUMBER

LEAF SPOT (Alternaria cucumerina) was general in one field at Hatzic, B.C.; it caused moderate damage to the foliage. (W. Jones)

SCAB (Cladosporium cucumerinum). Several severe attacks of scab were reported to the St. Catharines Laboratory this year. In a field near Brantford, Ont., it caused a loss of 25% of the fruit; the cucumbers were severely deformed due to early infection (J.K. Richardson). Affected specimens were received from the Waterford area, where it was reported to be causing a serious loss to growers in the district. (J.E. Howitt)

LEAF SPOT (Colletotrichum lagenarium) caused moderate damage to 2 greenhouse crops in the Olinda area, Ont. (L.W. Koch)

BACTERIAL WILT (Erwinia tracheiphila). An affected specimen was brought into the Laboratory at Ottawa, Ont. (L.T. Richardson). Some 200 hot-beds were affected on a farm at Ste. Dorothée, Que.; striped beetles were abundant (E. Lavallée). Besides serious outbreaks in the Montreal district, wilt has appeared at Quebec, but was less destructive. (O. Caron)

ROOT KNOT (Heterodera marioni). Mild infestations were observed in several greenhouses near Leamington, Ont., towards the end of the harvest period. (L.W. Koch)

STEM and FRUIT ROT (Sclerotinia sclerotiorum). The entire crop in the largest greenhouse in Essex Co., Ont., was destroyed at the peak of production by an outbreak of this disease; other greenhouses were affected to a lesser extent. (L.W. Koch)

MOSAIC (virus) occurred on several varieties in the verification trials at the Station, Summerland, B.C. (G.E. Woolliams). Severe damage from mosaic occurred in several greenhouse and field crops in Essex Co. Losses to individual growers ranged up to $1,000. In several cases, outbreaks in the field followed closely upon aphid infestation (L.W. Koch). Cucumbers appear to be more difficult to grow with each succeeding year, largely on account of severe infections of mosaic. Numerous growers in the Niagara Peninsula have given up the growing of cucumbers because of the disease (J.K. Richardson). Mosaic affected all the plants of Sensation grown at the Botanical Garden, Montreal, Que., but there was little distortion of the fruit (J.E. Jacques). A trace of mosaic (Cucumus virus 1) was found in a commercial field in Sunbury Co., N.B. (D.J. MacLeod). Mosaic affected all the plants of Early Fortune and caused severe damage in a greenhouse in Queens Co., P.E.I.; the affected plants wilted. (R.R. Hurst)

WILT (cause unknown). A severe wilt occurred in several of the verification plots at Summerland, B.C. The plants soon died after the leaves began to wilt. Repeated attempts to isolate a pathogen were negative. (G.E. Woolliams)

EGG PLANT

WILT (Verticillium Dahliae) is particularly severe in Lincoln Co., Ont., and causes the death of 50% of the plants set out. I have never seen a planting even reasonably free from the disease. (J.K. Richardson)

HOPS

DOWNY MILDEW (Pseudoperonospora Humuli) was general in the susceptible varieties, Clusters, Golding, and Brewers Gold on the lower mainland, B.C. It was very severe in Clusters in one large yard in Sardis early in the season. Lack of labour for spraying was partly responsible. Rainy, comparatively mild weather favoured its spread. The disease was then checked by dry weather and conditions were satisfactory during the harvest period. Golding seems to have become more susceptible to the disease, while Fuggles is still quite resistant (W. Jones). A severe infection occurred early in the season and caused moderate damage at St. Polycarpe, Que.; the disease was checked by application of copper dust. (L.J.S. Laporte)

POWDERY MILDEW (Sphaerotheca Humuli) was not severe this year at Cazaville and St. Polycarpe, Que. It was easily controlled with a few dustings with sulphur. In one yard at Ste. Justine, near St. Polycarpe, it did not show up and no dust was applied. (L.J.S. Laporte)

CHLOROSIS (virus). A slight infection was observed on Golding at Sardis, B.C. (W. Jones)

LETTUCE

DOWNY MILDEW (Bremia Lactucae) was general and severe on the foliage in a 5-acre crop grown for seed at Duncan, B.C.; the disease was checked later by dry weather. It also affected seed crops at Metchosin and Agassiz. (W. Jones)

ANTHRACNOSE (Marssonina Panattoniana) was collected by Mr. H. Ruhmann at Grand Forks, B.C. Infection was severe on the outer leaves. Only 3 acres of each of the two varieties, New York 12 and Hanson, were affected out of 13 acres planted for seed. The weather had been very wet and cold and crops were making very slow growth. The affected plants were very backward. This is the first report of the disease in the interior of B.C. (G.E. Woolliams)

DROP (Sclerotinia sclerotiorum) affected a few plants in a 5-acre seed crop at Duncan, B.C. (W. Jones). The damage was slight to moderate in several gardens at Edmonton, Alta., and severe in one planting at Lacombe.

YELLOWS (virus). Two affected plants were found in a private garden at the Station, Fredericton, N.B.; the virus was identified as Callistephus virus 1. (D.J. MacLeod)

BORON DEFICIENCY. The presence of this trouble was suspected at Charlottetown, P.E.I. in 1941. This year in a plot of Grand Rapids, one row was treated and the rest left as checks. All plants in the treated row were healthy, but 8% of the plants in the checks were affected. The symptoms were: poorly shaped leaves, spotting and burning of the leaf tips, injury to the growing tip and younger leaves. (R.R. Hurst)

LIMA BEANS

CHEMICAL INJURY caused moderate to severe damage to lima beans grown on land that had been sprayed in 1941 with Atlacide in Queens Co., P.E.I. (R.R. Hurst)

MELON

LEAF SPOT (Cladosporium cucumerinum) was general and caused moderate damage in the Leamington district, Ont., late in the harvesting period; sheltered poorly-ventilated plantations suffered more severe damage than others (L.W. Koch). Affected specimens were brought to the Laboratory from the Ottawa area. (L.T. Richardson)

ANTHRACNOSE (Colletotrichum lagenarium) severely infected the leaves and fruits of a single individual of snake melon, Cucumis Melo var. flexuosus, at the Botanical Garden, Montreal, Que.; the leaves died prematurely and the fruits were badly cankered. (J.E. Jacques)

SOFT ROT (Erwinia carotovora) destroyed 15% of the fruit in a garden at Charlottetown, P.E.I. (R.R. Hurst)

BACTERIAL WILT (Erwinia tracheiphila) affected about 5% of the plants in a planting of melons at the Laboratory, St. Catharines, Ont. (J.K. Richardson); infection was up to 2%, and damage mild in Essex Co. (L.W. Koch)

SOFT ROT (Rhizopus sp.). Imported melons developed this rot in September at Charlottetown, P.E.I. (R.R. Hurst)

MOSAIC (virus) affected 10% of the plants in a planting at St. Catharines, Ont.; affected plants produced no edible fruit (J.K. Richardson). All the plants of several cucurbits were affected by mosaic, but with little injury to the fruit at the Botanical Garden, Montreal, Que. These were lemon cucumber, C. Melo var. acidulus; Oka netted melon; Honey Dew pineapple melon; Large Sweet Cheese musk pumpkin; Chinese watermelon, Benincasa hispida; and club gourd, Trichoranthes anguina. The plants were being constantly pruned by the gardener to keep the vines off the paths and this may account for the high degree of infection. (J.E. Jacques)

LOW TEMPERATURE INJURY caused a loss of about 15% of the cantaloupe in a shipment from B.C. to Montreal, Que. (L.T. Richardson)

OKRA

WILT (Verticillium Dahliae). In one planting in Lincoln Co., Ont., about 20% of the plants were affected; in some plants it was sufficiently severe to render production negligible. (J.K. Richardson)

ONION

PURPLE BLOTCH (Macrosporium Porri) was severe on stalks of seed onions and others at Swan River, Man. (J.L. Gordon and I.L. Conners)

NECK ROT (Botrytis Allii) was destructive throughout the onion growing districts of the B.C. interior. The average loss in storage was about 10%. Among onions in cold storage, the loss was around 2%, but in common storage, it was often as high as 50%. At Grand Forks, the pathogen caused extensive loss among fall-planted bulbs for seed production. A few fields were relatively free, but in the majority, losses were high, sometimes being 75% of the bulbs. B. Allii also caused injury to the young shoots of the onion seed crop in the spring of 1942. Later a trace of infection occurred on the flower stalks. Infection in early spring and summer is unusual in this locality and was no doubt due to the cool damp weather that prevailed during the spring months (G.E. Woolliams). While Botrytis Allii is the more common pathogen in the field, B. cinerea may also occur. The latter causes a white spotting of the leaves followed by oval, whitish or grayish lesions about 1-10 mm. long, but the fungus fails to sporulate (C.E. Yarwood, U.S.D.A. Pl. Dis. Reporter 22: 428-429. 1938) (I.L. Conners). Slight rotting before harvest was observed in two gardens at Edmonton, Alta., followed by severe damage in storage (M.W. Cormack). A trace was found on Jan. 15, 1943 on onions in storage at Saskatoon, Sask. (B.J. Sallans). Neck rot affected about 5% of the onions in a shipment from the Leamington district, Ont., while it was held in storage at Blenheim; the shipment had to be regraded (J.K. Richardson); affected specimens were received from St. Laurent, Que. (E. Lavallée); affected 1% of the crop in a garden at Charlottetown, P.E.I. (R.R. Hurst)

SMUDGE (Colletotrichum circinans) slightly affected Silverskin onions at Kentville, N.S. (J.F. Hockey)

SOFT ROT (Erwinia carotovora) destroyed about 2% of the seed stalks in a crop of foundation stock of Prizetaker at Vineland Station, Ont. It also affected about 2% of the bulbs in a shipment from the Leamington area, Ont., in September (J.K. Richardson). The disease was found on Oct. 15 in a shipment of onions made in mid-September from Leamington, Ont. to Quebec City. (H.N. Racicot)

ROOT ROT (Fusarium sp.) severely affected the crop in a commercial garden, Charlottetown, P.E.I. (R.R. Hurst and G.C. Warren)

DOWNY MILDEW (Peronospora Schleideniana) caused severe damage to a small seed crop planting in North Saanich, B.C., in May. It also caused much damage in gardens early in the season but the disease was checked and did little damage in commercial fields late in the season on the lower mainland (W. Jones). Downy mildew was found affecting all the plants at Armstrong and fully 50% of the crop at Vernon. The disease was present at Kelowna, but not quite so prevalent. In general the loss was about half the crop. This is the first time that the disease has been recorded in the Okanagan Valley (H.R. McLarty). Downy mildew was prevalent and caused severe damage in many onion fields throughout Ont. (J.E. Howitt). It caused a great deal of damage about Quebec City, Que., the yields being reduced by half in certain fields (O. Caron). Three fields of onions grown for seed at St. Michel, Lavaltrie and Lacolle, respectively, were severely affected and loss was 50-60% of the crop. The disease also occurred in patches in many fields grown for the bulbs in Laval Co. (E. Lavallée). While the severity of infection was 90% causing 40% damage in a field grown for seed at St. Michel, the infection was 10% in other fields here and at L'Assomption. Diseased specimens were also received from Quebec City and Knowlton. (L.T. Richardson)

SMUT (Urocystis Cepulae) severely affected about 80% of the plants in a 1½ acre field, where the seed was sown directly in the field, at St. Michel, Que.; an adjacent field of transplanted onions was clean. (E. Lavallée)

PARSLEY

LEAF BLIGHT (Septoria Petroselini) was general in one small crop grown for seed at Duncan, B.C., and caused slight damage. (W. Jones)

PARSNIP

SCAB (Actinomyces scabies) infection varied from a trace to heavy in Hollow Crown parsnips in Queens Co., P.E.I., in May; severely affected roots were useless for table use. (R.R. Hurst)

LEAF SPOT (Cylindrosporium crescentum). Traces were present at Brandon Man. (W.L. Gordon)

LEAF SPOT (Ramularia Pastinacae) was general on the leaves and stems of a seed crop at Milner, B.C.; the damage was moderate. (W. Jones)

SCLEROTINIA ROT (S. sclerotiorum). The roots of a few plants were rotting in a garden at Edmonton, Alta.; S. sclerotiorum was isolated. (L.E. Tyner

PEAS

MYCOSPHAERELLA BLIGHT (Ascochyta pinodes). A moderate infection was observed at Otterburne, Ponemah, and Winnipeg, Man.; the organism was isolated in each case. (W.L. Gordon)

LEAF and POD SPOT (Ascochyta Pisi). Infection was moderate in several gardens at Edmonton, Alta., and ranged from a trace to severe in garden pea varieties at Lacombe and Olds; infection was a trace to slight in field peas at Brooks, Claresholm and Lethbridge and in the plots at Lacombe (M.W. Cormack). Traces present in all varieties of field peas at Ste. Anne de la Pocatière, Que. (R.O. Lachance); slight infection at L'Assomption (L.T. Richardson). Infection a trace to heavy on pods, leaves and stems in Ottawa test at Charlottetown, P.E.I., and also in many gardens. (R.R. Hurst)

GREY MOULD (Botrytis cinerea). Affected samples of Tall Telephone grown in the Gaspé, Que., were sent from a cold storage plant in Quebec City. (A. Payette)

SCAB (Cladosporium pisicola). Infection was a trace to very heavy in the Ottawa test at Charlottetown, P.E.I. (R.R. Hurst). This disease has not been previously reported in Canada outside of B.C. (I.L. Conners)

POWDERY MILDEW (Erysiphe Polygoni). A slight to moderate infection prevalent at Edmonton, Alta. (M.W. Cormack); infection moderate at Brandon, Man. and heavy on many leaves at Morden (W.L. Gordon); widespread and destructive, being especially severe in many gardens in Queens Co., P.E.I. Trials with dusting sulphur at Crapaud gave satisfactory control, but vigour of the dusted vines was reduced slightly. (R.R. Hurst)

NEAR WILT (Fusarium oxysporum) was found in a planting at Brooks, Alta. (A.W. Henry)

ROOT ROT and WILT (Fusarium spp.) Infection was moderate in most varieties in the plots at Lethbridge, Alta., and ranged from a trace to severe at Lacombe (M.W. Cormack); crop a total loss in a small garden at Phillipsburg, Que. (E. Lavallée). Root rot was slight to severe in 4 fields of Arthur peas inspected at Ste. Anne de la Pocatière, Que. (R.O. Lachance)

FOOT ROT. An examination by culture methods was made of several foot-rotted plants from plots of peas at the Laboratory, Winnipeg, Man. The following fungi were found associated with the disease at different times: Fusarium acuminatum, F. oxysporum, F. Solani f. Pisi, F. Scirpi, F. culmorum, Ascochyta pinodes, Rhizoctonia Solani and Gloeosporium sp. (W.L. Gordon)

DOWNY MILDEW (Peronospora Pisi) was of general occurrence on the lower mainland, B.C., but caused little or no damage; it usually affects the lower leaves only, but it is very occasionally present on pods (W. Jones); infection slight to moderate in plantings at Edmonton and Lethbridge, Alta. (M.W. Cormack); a trace in Ottawa test at Charlottetown, P.E.I. (R.R. Hurst)

BACTERIAL BLIGHT (Pseudomonas Pisi Sackett, Colorado Agr. Exp. Sta. Bull. 218: 3. 1916; cf. Dowson, Chron. Bot. 6: 199. 1941; Starr & Burkh. Phytopath. 32: 601. 1942). A slight general infection was found in several plantings at Brooks and Lethbridge, Alta.

WILT and ROOT ROT (Pythium sp.) Moderate to severe damage was observed in plantings at Brooks and Lethbridge, Alta.

ROOT ROT (Rhizoctonia Solani). A trace was found in a planting at Brooks, Alta.

POD SPOT (Septoria flagellifera). Moderate damage was observed in plots, seed of which was sent from Ottawa for field test at Saskatoon, Sask.; both S. flagellifera and Ascochyta Pisi present (H.W. Mead). Infection was a trace on leaves at Ponemah and slight at Winnipeg, Man. (W.L. Gordon)

LEAF BLOTCH (Septoria Pisi). Slight infection occurred at Claresholm, Alta., and in the plots at Lethbridge (M.W. Cormack); infection moderate at Brandon and Morden, Man., severe on some leaves at Winnipeg (W.L. Gordon). A trace was found on Chancellor, but other varieties were free at Ste. Anne de la Pocatière, Que. (R.O. Lachance)

RUST (Uromyces Fabae). Slight damage at Summerland, B.C. (G.E. Woolliams); traces on all varieties of field peas at Ste. Anne de la Pocatière, Que. (R.O. Lachance); 20% infection on foliage at L'Assomption (L.T. Richardson); infection a trace to heavy in test plots, seed of which was received from Ottawa, at Charlottetown, P.E.I.; reported also from many sections. (R.R. Hurst)

MOSAIC (virus) slightly affected several varieties at the Botanical Garden, Montreal, Que. (J.E. Jacques). Mosaic (Pisum virus 2) affected 2% of the plants in a garden at Fredericton, N.B.; the plants showed a conspicuous veinal mottle and stunting (D.J. MacLeod); occasional plants affected in Ottawa test at Charlottetown, P.E.I. (R.R. Hurst)

PEPPER

FRUIT and LEAF SPOT (Alternaria sp.) was quite general in many districts in South-western Ont.; although fruit infection was common, the greatest damage in many cases was caused by defoliation of the plants. (J.K. Richardson)

WILT (Verticillium sp.) affected 5% of the plants in a planting at Brantford, Ont. (G.C. Chamberlain)

BACTERIAL SPOT (Xanthomonas vesicatoria (Doidge) Dowson, Zentralbl. f. Bakt. Abt. 2, 100: 190. 1939; Bacterium vesicatorium Doidge, Journ. Dept. Agr. So. Africa 1: 718. 1920; cf. Starr & Burkholder, Phytopath. 32: 600. 1942). On Aug. 18, when the observations were made, many green fruits were unmarketable on account of bacterial spot in a 15-acre block of peppers at Brantford, Ont.; the foliage was also moderately affected (J.K. Richardson). Although the pathogen was not definitely determined, this is probably the bacterial spot of peppers described by B.B. Higgins (Phytopath. 12:501-516. 1922) and shown to be the same as bacterial spot of tomatoes by M.W. Gardner and J.B. Kendrick (Phytopath. 13: 307-315. 1923). (I.L. Conners)

INFECTIOUS CHLOROSIS (virus) was quite prevalent in the verification plots at the Station, Summerland, B.C. (G.E. Woolliams)

MOSAIC (virus). Affected specimens from scattered points in Lincoln Co., Ont., were brought to the Laboratory for identification; infection was slight. Mosaic was also found in the Brantford district. (J.K. Richardson). All plants of Red Chili pepper (Capsicum frutescens var. acuminatum) and Tobasco cone pepper (C. f. var. conoides) were dwarfed by mosaic and bore only small fruits at the Botanical Garden, Montreal, Que., while only one plant out of 10 of Long Red Cayenne Chili (C. f. var. longum) was affected. (J.E. Jacques)

MOSAIC and STREAK (virus). Two plants were found affected in a commercial field in Sunbury Co., N.B.; the virus was identified as Solanum virus 1, "L" strain. (D.J. MacLeod)

POTATO

The Plant Protection Division, Science Service, has supplied information on the extent of the seed potato industry, the acreages of the leading varieties passing inspection, the extent of fields which failed to pass inspection and the average percentages of the diseases - black leg, leaf roll, and mosaic - found in the fields. All fields entered for certification are planted with certified seed.

Table 3 - Seed potato certification: Number of Fields and Acres Inspected, 1942.

Province	Number of Fields		Fields Passed %	Number of Acres		Acres Passed %
	Entered	Passed		Entered	Passed	
P.E.I.	3,282	2,238	68.2	13,720	9,200	67.1
N.S.	429	337	78.6	935	746	79.8
N.B.	1,900	1,141	60.1	10,311	6,141	59.6
Que.	1,057	350	33.1	1,869	598	32.0
Ont.	579	439	75.8	1,627	1,213	74.6
Man.	86	63	73.3	254	166	65.4
Sask.	89	60	67.4	138	72	52.2
Alta.	126	108	85.7	263	184	69.9
B.C.	399	287	71.9	864	555	64.2
TOTAL	7,947	5,023	63.2	29,981	18,875	62.9

Acres Entered		Acres Passed	
1941	37,668	1941	24,405
1942	29,981	1942	18,875
Decrease of 7,687 or 20.4%		Decrease of 5,530 or 22.7%	

Table 4 - Seed Potato Certification: Acreages passed by Varieties, 1942.

Variety	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.-Alta.	B.C.	Total
Green Mountain	3,407	74	2,196	570	65	18	39	6,369
Irish Cobbler	4,766	228	244	19	115	136	4	5,512
Katahdin	753	274	2,692	9	681	6	8	4,423
Bliss Triumph	55	107	909			2	2	1,075
Netted Gem					7	193	393	593
Chippewa	10	9	6		268	3	9	305
Sebago	140	5	46		10			201
Warba	14	5			16	11	17	63
Rural New Yorker					49			49
Arran Consul			45					45
Houma	39					1		40
Other Varieties	16	44	3		2	52	83	200
TOTAL	9,200	746	6,141	598	1,213	422	555	18,875

There was a sharp contraction for a second year in the acreage of potatoes grown for certification. The percentage of fields passing inspection was also equally low. In fact, the percentage of fields that have passed in 1941 and 1942 is the lowest ever experienced except for the first 3 years, when seed potato certification was first established on a large scale and the supply of disease-free stock was limited. This year, leaf roll was the chief cause of rejection, mosaic was second and bacterial ring rot third. Although mosaic has yielded first place to leaf roll as a cause of rejection, and still is an important factor, the sharp falling off of the percentage of fields passing inspection is due to leaf roll and to a limited extent, to bacterial ring rot. This failure of many fields to pass inspection may be one cause for the present curtailment of acreage, but it is unfortunate that more high-quality seed is not available when production of food has become so important on this continent.

Table 5 - Seed Potato Certification: Fields rejected on Field Inspection, 1942.

Province	Leaf Roll	Mosaic	Bacterial Ring Rot	Adjacent Diseased Fields	Black Leg	Foreign Varieties	Misc.	Total
P.E.I.	474	327		73	47	41	82	1,044
N.S.	25	23		17		14	13	92
N.B.	350	123	80	91(47)[x]	7	40	66	759
Que.	121	117	186	144(92)	39	5	95	707
Ont.	31	13	12	25(11)	13	13	33	140
Man.	1	3	1	1	7	2	8	23
Sask.		7	2	5(1)	6	4	5	29
Alta.		4		6	7		1	18
B.C.	36	29	1	25	1	3	17	112
TOTAL	1,038	648	282	387(151)	127	122	320	2,924
Rejections as a percentage of fields:								
Entered	13.1	8.2	3.6	4.8	1.6	1.5	4.0	36.8%
Rejected	35.5	22.2	9.7	13.2	4.3	4.2	10.9	100.0%

[x] Figures in curves are the fields rejected because bacterial ring rot occurred in other fields on the same farm.

Table 6 - Seed Potato Certification: Average Percentage of Disease Found in Fields, 1942.

Average percentage of disease found in	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
	%	%	%	%	%	%	%	%	%
Fields entered (first inspection)									
Black Leg	.16	.07	.13	.18	.17	.78	.47	.19	.06
Leaf Roll	1.35	.75	1.68	.57	.32	.14	.02	.15	.62
Mosaic	.70	.52	.71	.56	.15	.23	.78	.32	1.03
Fields passed (final inspection)									
Black Leg	.06	.04	.05	.13	.06	.12	.01	.01	.02
Leaf Roll	.33	.20	.31	.37	.10	.09	.01	.02	.10
Mosaic	.10	.08	.12	.38	.04	.12	.13	.03	.05

COMMON SCAB (Actinomyces scabies) only slightly affected some crops in B.C. and the affected tubers can easily be graded out (H.S. MacLeod). Scab was prevalent again in 1942 in the smooth-skinned varieties in Alta., and one lot of tubers of those so far inspected was too severely scabbed to be graded for certified seed; in Sask., however, scab was not prevalent (J.W. Marritt). Infection was general but light in Man. and northwestern Ont. (J.W. Scannell). On account of the hot, dry weather, common scab was found in most lots of potatoes grown in the district along the lower St. Lawrence, Que. In a few lots, where heavy applications of lime had been made in the preceding years or barnyard manure applied to the soil the current season, 75-100% of the tubers were affected and the lots were rejected (B. Baribeau). On specimens received from potato-growing centres in L'Islet, Kamouraska and Rimouski counties, scab was very superficial, but covered more of the tuber surface than usual. This behaviour was attributed to the unusually dry conditions prevailing in July and August in eastern Que. (C. Perrault). Scab was severe on a crop grown probably for the farmer's own use at Lac des Iles. (H.N. Racicot)

Nearly all crops were affected to some extent in N.B. and in some sections half the tubers were scabbed (C.H. Godwin). Scab was found in 40% of the crops in N.S. in 1942 as against 20% last year, and the average tuber infection was about 1%; the dry season probably favoured the disease (W.K. McCulloch). Scab was more prevalent than last year in P.E.I.; average tuber infection ranged from a trace to heavy, being severe on all the tubers in one field at Belmont. (S.G. Peppin and R.R. Hurst)

EARLY BLIGHT (Alternaria Solani) was found in several areas in B.C., but no estimate of damage was made, due to the presence of late blight in most fields (H.S. MacLeod). Early blight was more prevalent than usual in Alta.; infection was slight to moderate in several plantings at Edmonton and Lethbridge (M.W. Cormack). A moderate infection occurred on early varieties in the Estevan district, Sask. (J.W. Marritt). Early blight was severe at Dundurn; it was reported and specimens received from several other places (H.W. Mead). The disease was prevalent in Man. and northwestern Ont. (J.W. Scannell). General in Que. on account of the drought (O. Caron). Early blight was general throughout the lower St. Lawrence region, Que. In certain fields it appeared early in July and where no spraying was done, it caused much damage to the foliage. The presence of tip

burn further increased the injury (C. Perrault). It was observed in a few fields in the Chicoutimi, Quebec, and the lower St. Lawrence districts (B. Baribeau). Early blight was present in some areas in N.B., but yields were not reduced (C.H. Godwin). This disease was reported in Colchester Co., N.S., on July 23 and in Kings Co. on July 29. The season was very dry and it was difficult to distinguish between drought injury and blight damage. Crops were rather severely affected, but good yields were obtained. A trace of Alternaria rot was seen (W. K. McCulloch). A slight amount of early blight was present late in the season in P.E.I. (S.G. Peppin). Six tubers showing typical symptoms of early blight rot were brought to the Laboratory in Jan., 1942. (R.R. Hurst)

APHIS INJURY. In Que., in certain fields of Green Mountain, where aphids were very numerous, some necrosis of the younger parts of the stems and of the veins was observed. The leaves curved downward and gave to the tops of the plants a rosette appearance. Streaks were seen on the veins and top parts of the plant similar to streak in tomato. The affected plants could be observed easily in the fields, due to the stunted and rosette appearance of their tops. (C. Perrault)

GREY MOULD (Botrytis cinerea) affected occasional plants in a field in P.E.I. (R.R. Hurst)

ANTHRACNOSE (Colletotrichum atramentarium) was collected in a garden at Indian Head, Sask., where the vines were almost completely dead by early August and the tubers were mostly under 2 in. in length. A few nearby rows, possibly of a different seed lot, were not affected (B.J. Sallans). The characteristic cigar-shaped conidia were present in abundance on the lesions along with the long, dark, sparingly septate, setae (I.L. Conners). The disease was observed in 2 fields at Ste. Anne de la Pocatière, Que. Affected plants died down 2 to 3 weeks before healthy plants. The damage was slight if any. (C. Perrault) The fungus was found fruiting on a few stems at Kentville, N.S., on Sept. 16. (J.F. Hockey)

BACTERIAL RING ROT (Corynebacterium sepedonicum (Spieckermann & Kotthoff) Skaptason & Burkholder, Phytopath. 32: 441. May 1942; C. sepedonicum (Spieck.) Dowson, Trans. Brit. Myc. Soc. 25: 312. June 1942; Phytomonas sepedonica (Spieck.) Magrou; Bacterium sepedonicum Spieckermann 1913, nomen nudum; B. sepedonicum Spieckermann & Kotthoff 1914) was found in a small field of Sequoia entered for certification at Salmon Arm B.C. The original seed was certified stock purchased by the grower from North Carolina in 1940. The disease was also found at Vancouver in shipments of table stock from Sask. and Alta. This is the first time the disease had been found in B.C. and every effort has been made to eradicate it. (H.S. MacLeod and W. Jones) Smears made from material from Salmon Arm and tubers of Irish Cobbler collected at Vancouver from a Sask. shipment were positive for this organism. (H.N. Racicot) Subsequently it was learned that samples of the Sequoia variety had been distributed around the countryside by the grower and the disease has since been located on a farm at Vernon, where one of these samples had been grown. (G.E. Woolliams)

A survey for bacterial ring rot was made in 1942 in 26 townships, mainly in the irrigated sections of Alta. Some 550 farms were visited and 406 inspections made. The presence of the disease was verified by microscopic examinations done by L.E. Tyner, Dominion Laboratory of Plant Pathology, Edmonton. As a result of the survey, the disease was found in 22 townships on 151 farms and

affected 982.5 acres. In addition, 296 acres appeared sound but were on farms, where the disease was detected. The more characteristic symptoms of the disease were visible for such a limited period that the disease was probably more prevalent than the figures indicate.

Until 1942, ring rot was confined in Alta. to the Lethbridge area, including Taber and Raymond, except for 3 small fields at Medicine Hat. Ring rot was not located this year at Medicine Hat, but instead, it was found in 5 fields at Brooks and Rosemary in the Eastern Irrigation District and in one at Drumheller. The disease continues to be a serious problem in the Lethbridge area from Picture Butte to Raymond and from Coalhurst to Taber. Ring rot was found on 145 farms in the area, an increase of 46; approximately half of the commercial acreage in potatoes was affected by the disease. On 68 farms, ring rot was found in previous years and the disease reached new farms by the purchase of affected seed and by the use of borrowed machinery, which had become contaminated. A considerable number of growers were apparently able to get rid of the disease on their farms by the purchase of clean seed and carrying out the recommended clean-up of their premises. (J.L. Eaglesham) Bacterial ring rot was found in one field entered for certification near Lethbridge and a second field in the Brooks district was adjacent to one of affected table stock. (J.W. Marritt)

Bacterial ring rot appeared to be fairly established in the Pike Lake area, Sask. During a one-day survey, suspected plants were collected in 7 fields of table stock and smears from tubers from 4 of the 7 fields were positive. (P.M. Simmonds) Ring rot was in 2 fields entered for certification. One of these was in the Pike Lake area and the other in the Punnicky district. One other field was rejected because ring rot occurred on the farm. A brief survey of fields of table stock in the Pike Lake area indicated that the disease was fairly general and the inspector was informed that the disease occurred elsewhere in the Punnicky district. (J.W. Marritt) Ring rot was found in only one field entered for certification in Man.; it was presented on the same farm in previous years. No cases were found in table stock. (J.W. Scannell) Tubers collected at Vancouver, B.C. from a carload of table stock from Man. by W. Jones were positive for the organism. (H.N. Racicot)

Bacterial ring rot was found in Ont. on 18 farms where certified seed was used compared to 35 in 1941. Infection ranged from 0.1% to 3%. These farms were located: 7 in Cochrane District, 4 in Dufferin Co. and one each in Carleton, Norfolk, Ontario, Peterborough, Renfrew, Simcoe and Sudbury counties. The disease was also encountered on 19 farms in table stock in some of the same counties. Ring rot was destructive in a field of table stock in Gatineau Co., Que. Over 60% of the crop was left in the field upon digging. These Green Mountains had been grown on the farm for 5 years (O.W. Lachaine). Tubers submitted by Mr. J.T. Cassin, Ont. Dept. of Agriculture, from Alliston and Uxbridge were found affected. (H.N. Racicot)

Bacterial ring rot was found in nearly all counties visited in Que. in 1942. Of the 1,057 fields inspected, 278 were rejected for certification on account of the disease. It was present in 186 fields and on the same farm in 92. This year, ring rot was most prevalent in Chicoutimi, Lake St. John and Lower St. Lawrence districts where 237 fields were rejected out of 446 inspected; 69 of these fields showed no ring rot, but were on farms where the disease occurred. This high percentage of infected fields is due mostly to the use of contaminated implements, cutting knife and sacks, often shared with neighbours. (B. Baribeau).

In all, the crop from 97 fields entered for certification were rejected for ring rot in N.B. in 1942 compared with 254 in 1941; the disease was discovered in 80 cases during field inspection, and was found later in 17 others, as against 205 in the field and 49 later in 1941. Ring rot was also observed in 11 fields of table stock. (C.H. Godwin)

Bacterial ring rot was not reported in N.S. this year (W.K. McCulloch). Ring rot was not found in the field in P.E.I., but it was observed on Oct. 29 in one lot of Irish Cobbler grown at Armadale. (R.R. Hurst and S.G. Peppin)

BLACK LEG (Erwinia phytophthora) was not prevalent nor severe in B.C.; it was in 39 fields or 9.7% entered for certification and resulted in the rejection of one (H.S. MacLeod). Most of the fields affected by black leg in Alta. were in the Peers and Duchess districts; 13% of the fields were affected and 7 fields were rejected. Black leg developed in 17% of the fields inspected in Sask. and caused the rejection of 6; the affected fields were mostly in the north-eastern part of the province (J.W. Marritt). Black leg was epidemic in some fields in Man. At the time of the first inspection in July, the usual amount of black leg was present, which the growers then rogued out. In August, infection was 4.3-13.3% in these rogued fields and by Sept. 1 these amounts were doubled. Black leg was responsible for 7 out of 14 rejections made for disease in Man. and for 3 out of 4 in northwestern Ont. (J.W. Scannell)

Ten fields were rejected for black leg in Ont. as against 8 in 1941 (O.W. Lachaine). Small amounts of black leg were reported from many places throughout Que. (O. Caron). The disease was particularly noticeable in Témis-couata, Chicoutimi and Labelle counties and caused the rejection of 39 fields (B. Baribeau). There was some increase over recent years in N.B. in the amount of black leg in affected fields, but it caused the rejection of only 7 fields, the same as last year. Most of the disease was located in the same areas as in previous seasons and was due mostly to late infection (C.H. Godwin). Black leg was present in 78 fields, mostly of Irish Cobbler, in N.S., but no fields were rejected. The number of infected fields was double that of last year, although 42 showed only a trace (W.K. McCulloch). Black leg was less prevalent than in 1941, only 47 fields being rejected; very little was present in the early season, but more developed later (S.G. Peppin). Affected plants were found here and there in 48 fields of table stock examined; infection never exceeded 2% in any field. (R.R. Hurst)

STEM-END ROT (Fusarium Solani var. eumartii). Tubers sent in by J.T. Cassin from a field of Irish Cobbler at Harrow, Ont., were severely affected by stem-end rot and rhizoctonia; 8% of the plants were wilting in the field (H.N. Racicot). The disease was not a problem in Ont. in 1942. (O.W. Lachaine)

TUBER ROTS (Fusarium spp.). F. avenaceum was considered the cause of dry rot in affected tubers scattered through 80 carloads in storage at Duchess, Alta.; other fungi commonly isolated were F. caeruleum and F. sambucinum f. 6 (M.W. Cormack). Some 6% of the tubers were affected in one cellar at St. Roch des Aulnaies, Que. (A. Payette). Tubers received from B. Baribeau were found affected by dry rot and black heart. The tubers were from a field in Que., which had passed inspection, but they were left for some time after harvest in rather airtight barrels. It was reported that 8-10% of the tubers were so affected (L.T. Richardson). Tubers affected by dry rot from the 1941 crop were received from Ogema and Richard, Sask. (T.C. Vanterpool)

WILT (Fusarium sp.) was reported in only 4 fields in B.C. in 1942 and did not cause any rejections (H.S. MacLeod). Light infections of wilt were present in Man. and northwestern Ont., and one field entered for certification was rejected in Man. (J.W. Scannell). Only 8 fields were rejected for wilt in Ont. (O.W. Lachaine). The disease was observed in a few fields in the lower St. Lawrence district, Que. At digging time, the tubers from these plants were affected by dry rot. Bruised and cut tubers were more severely affected (B. Baribeau). A large proportion of the potatoes in Kamouraska and Témiscouata counties which reached the Laboratory for examination for the bacterial ring rot were infected with Fusarium oxysporum. (A. Payette)

RHIZOCTONIA (Pellicularia filamentosa (Pat.) Rogers; Hypochnus filamentosus Pat.; Corticium Solani (Prill. & Del.) Bourd. & Galz.). Students of the Thelephoraceae have recognized for some time that certain genera were badly in need of revision. Due to the plethora of described species, it became clearly impossible for one student to present a complete revision in a single paper. Attention has, therefore, been directed to the segregation of groups of naturally related species. "Pellicularia is distinguishable by very short-celled stout hyphae .... , by right-angled branching of the mycelium, by very stout basidia and by mucedinoid texture," according to D.P. Rogers (Farlowia 1(1): 95-118. 1943). Donk (Nederl. Myc. Ver. Med. 18-20: 1931) proposed the genus Botryobasidium for this "distinct and well characterized systematic and phyletic unit, for which the need had long existed." Rogers, however, found it necessary to adopt the name Pellicularia proposed by Cooke for P. Koleraga. (I.L. Conners)

Although rhizoctonia was prevalent in fields in most areas in B.C., it was not as severe as usual. Sclerotia were less common than in the average year on the tubers in the bins inspected so far; a few lots will have to be graded fairly heavily (H.S. MacLeod). Injury by rhizoctonia was not prevalent in Alta.; only 6% of the fields, mostly of Early Ohio, showed more than slight injury. In Sask., rhizoctonia caused severe injury in 4 fields and moderate in 19; sclerotium formation was slight on the tubers (J.W. Marritt). Rhizoctonia was not severe on the tubers in Man. in 1942 as had been expected; the crop was slow in maturing and the tubers were harvested soon after the vines were killed by frost (J.W. Scannell). Rhizoctonia was present throughout Que. Average infection was slight on the tubers; only 2 lots, with 80-90% of the tubers infected, were rejected at bin inspection (B. Baribeau). The disease was present to some extent in every field in N.B. and sclerotia occurred on the tubers in most lots; no lot was rejected at bin inspection (C.H. Godwin). Rhizoctonia was apparently more widespread than usual in N.S. It was reported in 70% of the fields of Irish Cobbler, 60% of Katahdin, 50% of Bliss Triumph and 20% of Green Mountain. Some 50% of the tubers were affected in some crops with an average infection of 5% of the tubers (W.K. McCulloch). Rhizoctonia caused slight to moderate damage in the field in P.E.I. It also slightly affected 5% of the tubers (S.G. Peppin). The perfect stage was a common sight in the field during wet weather in August. At harvest time, sclerotium infection was a trace on Irish Cobbler and Green Mountain. (R.R. Hurst)

LATE BLIGHT (Phytophthora infestans) was first found in B.C. on June 4, the earliest date on record in B.C. Weather conditions were very favourable for the development and spread of the disease in the early part of July. Defoliation suffered by the plants in early stages of growth greatly reduced the yields, especially in late-planted fields. Late blight was most prevalent in the Fraser Valley, but it was found in several other localities. After July 17, the weather

was unusually fine and dry and the spread of the disease was checked. Most of the crop was clean and dry when harvested. There was little loss from rot of the tubers, especially in crops that were well sprayed. Nevertheless, due to the attack early in the season, late blight was estimated to have caused a greater reduction in yield in B.C. in 1942 than in any previous year. Spraying is not yet general in the areas where the disease is found frequently (H.S. McLeod). Late blight caused severe damage for the second successive year in Man., especially in the Red River Valley. It was impossible to determine the exact amount of damage, as many potatoes were frozen in the ground in September and the secondary rot that developed in the frosted tubers was not easily distinguished from rot following late blight. Late blight was extremely severe in the Rainy River district, Ont., but it caused little or no damage in the Thunder Bay district, where the summer was very dry; it also occurred in the Dryden district. (J.W. Scannell)

Late blight was epidemic in a few counties in eastern Ont., where over 50% of the crop was lost; the disease was also present in all sections where late varieties are grown (O.W. Lachaine). Late blight was prevalent in most of the important potato-growing districts of Ont.; at digging time, crops were seen where over 30% of the tubers were showing rot (J.E. Howitt). Late blight was not a serious problem in Que. in 1942. It was reported causing the death of vines on Aug. 15 in the Montreal and Three Rivers districts. The disease appeared in the Chicoutimi district and along the lower St. Lawrence, especially in the Gaspé at the end of August, but caused no tuber rot (B. Baribeau). According to information received, late blight was rare in eastern Que., but it became prevalent in the western part of the province (O. Caron). A severe outbreak of late blight developed early in July in Carleton Co., N.B., and it spread later throughout the other counties. Such an early outbreak seriously set back plant growth and resulted in a reduction in yield. Dry weather during Aug. checked the disease and prevented tuber infection. Loss from rot was very small. (C.H. Godwin)

Late blight was general in N.S., but except in a few cases, infection was slight. It was reported in Kings Co. on Aug. 1 and in Colchester Co. on Aug. 13. All varieties including Sebago were affected. In general, spraying was effective and large crops of sound tubers were harvested. However, 40% of the tubers were infected in a lot of 200 barrels of Bliss Triumph and 30% in a lot of Early Rose. Tuber rot averaged 1.5%. Infection was very severe in two fields, which had produced a severely blighted crop the previous year (W.C. McCulloch). Late blight was reported in P.E.I. on July 25, following a rainy period of 6 days. In the next week it was recorded from many points throughout the province. Its great prevalence at this early date has been observed previously in years following a severe outbreak, such as occurred in 1941 (P.D.S. 21: 47). By late August it had caused severe damage in many potato fields on account of the premature death of the tops. Many farmers, unfortunately interrupted their spray schedules because they thought the lack of heavy rains in the first half of September had definitely arrested the further spread of blight. New growth was unprotected, and a late-season outbreak caused a loss varying from 10 to almost 100% of the crop in individual fields. Rot destroyed 21% of the seed pieces in 7 fields of Green Mountain in June; the seed was cut from tubers affected by late blight. In fact throughout the winter of 1941-42, severe losses from rot occurred because such a high percentage of blight-infected tubers was placed in storage in the fall of 1941 (R.R. Hurst). Late blight was moderate to severe in P.E.I., depending on the variety and locality. Late blight rot was prevalent over most of P.E.I., but was most severe in the central area; the average loss was 10%. (S.G. Peppin)

SOFT ROT or LEAK (Pythium ultimum) caused numerous misses in tuber-index tests in the greenhouse at Sidney, B.C., Feb., 1942. The tubers were not well callosed, greenhouse temperature was high and the soil had not been sterilized (W. Jones). Severe rotting occurred in 2 carloads shipped from Edmonton, Alta. to Vancouver in September. The tubers were harvested during wet weather and were apparently not properly dried before shipping. (G.B. Sanford)

SOFT ROT (Rhizopus sp.) was affecting a few Green Mountain tubers brought to the Laboratory at Charlottetown, P.E.I. in November; the tubers showed mechanical injury. (R.R. Hurst)

SILVER SCURF (Spondylocladium atrovirens) was observed a few times in Que.; infection was slight (B. Baribeau). It was present to some extent on Irish Cobbler in several parts of N.B. (C.H. Godwin). Observations indicate that infection will be moderate to severe in P.E.I. (S.G. Peppin). A considerable amount of silver scurf was present on Irish Cobbler in April, 1942, and a trace occurred on Green Mountain. (R.R. Hurst)

POWDERY SCAB (Spongospora subterranea). A single tuber was found infected in a greenhouse at Edmonton, Alta. (J.G. Grimble). The disease was observed only in Témiscouata and Kamouraska counties, Que.; infection was slight (B. Baribeau). A few cases were reported in N.B., but infection was not severe (C.H. Godwin). Powdery scab was reported in 6 fields in N.S.; infection ranged from 0.25 to 2% of the tubers. In one field of Bliss Triumph, where 5% of the tubers were very severely infected in 1938, infection this year was 1.25% (W.K. McCulloch). Only one or two cases of powdery scab were found in P.E.I. (S.G. Peppin)

WART (Synchytrium endobioticum) was not observed again, since it was discovered in 1941. Further search was made during the summer and although many lots of "English" potatoes were found and examined, no trace of wart was seen. The small garden in Halifax, where the disease was found, has been kept under observation by the Plant Inspection Service. (W.K. McCulloch)

WILT (Verticillium albo-atrum) ruined a field of potatoes grown for home consumption at Summerland, B.C. (G.E. Woolliams). The disease was frequent and often caused evident damage in Alta. (M.W. Cormack). Wilt affected only a few plants in the fields where it was observed in N.B.; most of the affected fields were in the central part of the province (C.H. Godwin). Wilt caused the rejection of one field and slightly affected 6 others in N.S. The source of infection was usually the seed, in which the disease had been detected previously (W.K. McCulloch). Several specimens were brought to the Laboratory from North Mountain, N.S., for identification; the organism was isolated (J.F. Hockey). Very little wilt was reported in P.E.I. in 1942; however, it should be noted that wilt symptoms were probably masked by the severe late blight infection. (S.G. Peppin)

WILT (Verticillium and Fusarium). A trace to 0.33% of affected plants was found in 10% of the fields inspected in Alta. and Sask.; moisture was plentiful in Sask., throughout the season. (J.W. Marritt)

LEAF ROLL (virus) was more prevalent and severe in B.C. in 1942 than in the previous year. It was found in 191 fields or 47.8% of those inspected and was the cause of rejection of 36 or 9.0% (H.S. MacLeod). Leaf roll was found in

Alta. in only 10% of the fields inspected, a definite reduction from last year, and no fields were rejected. However, there was evidence of late-season spread of leaf roll in the University plots, Edmonton, similar to that observed in 1940; but necrosis in the tubers and primary symptoms in the vines were less pronounced. Nevertheless an increase of leaf roll is anticipated in 1943, although current season symptoms were not observed in fields entered for certification in the district. Leaf roll has never been prevalent in Sask.; in 1942, a few plants were found in only 6% of the fields entered for certification (J.W. Marritt). Leaf roll was more prevalent than usual in Man. and northwestern Ont.; one field was rejected in Man. (J.W. Scannell)

Leaf roll was the cause of rejection of 31 fields in Ont.; 10% of the plants were affected in one field of Irish Cobbler, but in most fields rejected infection ranged from 2 to 5% (O.W. Lachaine). Leaf roll appeared to be increasing to an alarming degree in some districts of Que. In Nicolet Co., 61 fields were rejected out of 111 entered for certification (B. Baribeau). Leaf roll was the cause of rejection of 350 fields in N.B. as against 469 in 1941. However, the disease continues to be severe. Many fields of table stock were planted with seed from fields where leaf roll had been prevalent; this year's crop also showed a high percentage of leaf roll (C.H. Godwin). Leaf roll caused the rejection of 25 fields in N.S. Control measures are less rigorously carried out, due to the shortage of labour, etc. Among the new varieties, Chippewa appears to be very susceptible. (W.K. McCulloch) Leaf roll was more prevalent in P.E.I. than in 1941; 474 fields were rejected against 263 in the previous year (S.G. Peppin). Leaf roll was observed in Irish Cobbler, Green Mountain, Katahdin and Sebago; besides leaf roll being present in more fields, very high percentage of affected plants were recorded in some. (R.R. Hurst)

MOSAIC (virus) was found in 225 fields in B.C. and caused the rejection of 29 or 7.3%; the average number of rejections from 1936 to 1942 inclusive was 22.7 fields or 5.9% (H.S. MacLeod). Climatic conditions were favourable for development of symptoms of mosaic in the central and northern parts of Alta. and in Sask. Mosaic was found in 23% of the fields and caused the rejection of 4 in Alta.; in many fields only a slight mottling was observed. Mosaic was observed in 59% of the fields and caused the rejection of 7 in Sask.; symptoms ranged from slight to moderate mottling in most fields (J.W. Marritt). Mosaic was readily detected and may account for the apparent increase in Man.; one field in Man. and one in Northern Ont. were rejected (J.W. Scannell). In Ont., 12 fields were rejected on account of mosaic (O.W. Lachaine). The disease was slightly less prevalent in fields entered for certification in Que. than in 1941; 117 fields were rejected for mosaic (B. Baribeau). Mosaic was reported from many localities in Que. (O. Caron). The disease was less severe in fields entered for certification in N.B. than previously. The disease is more prevalent in table stock fields, especially where the same stock is used year after year; in one field the seed had been used for 17 years, and every plant was affected with mosaic (C.H. Godwin). Mosaic was not quite as widespread in N.S. as in 1941. It was found in 37% of the fields and caused the rejection of 5%. Green Mountain and Bliss Triumph continue to be the worst affected (W.K. McCulloch). Mosaic was less prevalent in P.E.I. than last year; 327 fields were rejected (S.G. Peppin). In 48 fields of table stock, chiefly of Irish Cobbler and Green Mountain, mosaic was present in every field; not less than 25% of plants were affected in most fields and 82% were affected in one field of 2 acres. (R.R. Hurst)

PURPLE DWARF was observed in several fields in Alta., but apparently

this malady was much scarcer than in 1940 (G.B. Sanford). This trouble was present in 5% of the fields examined in 1941; the number of affected plants has been greatly reduced in the past two years (J.W. Marritt). Affected plants, according to Dr. H.T. Gussow, greatly resemble those affected by "haywire", which he saw at Cornell University several years ago. "Haywire" is apparently a disease, described by Goss from Nebraska. (I.L. Conners)

PURPLY TOP was observed in all fields of Katahdin inspected in N.B. The trouble apparently increases as the season advances. The same condition existed in fields of other varieties (C.H. Godwin). From 1 to 2% of the plants were found affected with purple top in N.S. this year. The trouble was quite conspicuous in 1940, almost disappeared in 1941, and was easy to find in 1942. Many large fields of Katahdin where the seed was planted in tuber-units were inspected in person and only rarely was found more than one infected plant to a unit. The disease seemed to be worse in low-lying or damp parts of the field. One of the worst cases was a 22-acre field in Upper Musquodoboit Valley, Halifax Co. The seed for this field was developed from a ½ bu. of tubers from the plots at Kentville, where the disease has never been seen, and no other potatoes were grown on the farm at Musquodoboit (W.K. McCulloch). Purple top was severe on Sebago, moderate to severe on Katahdin and Irish Cobbler, and slight on Green Mountain in P.E.I. The crop was reduced considerably and tubers from affected plants were often flabby (R.R. Hurst). The same trouble was observed in 1939. (S.G. Peppin)

S.G. Younkin (Phytopath. 33: 16. 1943) reports that "further evidence has been obtained indicating that the eastern strain of the aster-yellows virus may cause purple-top wilt of potatoes". In greenhouse tests, Green Mountain was less susceptible than Katahdin and Smooth Rural. It was transmitted by grafting 4 times out of 200 grafts, using scions from naturally infected purple-top plants of Katahdin, Sebago, Rural and Cobbler collected from 18 localities in New York and Pennsylvania. No claim is made that the disease in the Maritimes is identical with that reported by Younkin, but it will be noted that varietal reactions are similar. Possibly purple top was only noted in potatoes in recent years because the older varieties were not particularly affected. However, if it is due to aster-yellows virus, its appearance in potatoes may in some way be connected with the outbreak of yellows in carrots, which has become very destructive to the latter, particularly in N.B. and N.S.

SPINDLE TUBER (virus) was recorded as follows: In 72 fields in B.C., but none were rejected on that account; one field rejected in Man.; growers know the disease better than formerly; no more serious in Ont. than in 1941; reported in a few lots in Que.; only one field rejected on account of spindle tuber in N.B.; improvement attributed to the use of better seed, particularly of Katahdin; seen in 2 fields of Sebago in N.S.; pear-shaped tubers of Katahdin and cylindrical ones of Irish Cobbler found frequently; very little found in P.E.I., symptoms probably masked by late-blight infection; a trace to 12% seen in table stock of Irish Cobbler and Green Mountain.

WITCHES' BROOM (virus). Found in 72 fields in B.C., but the number of affected plants was small.

YELLOW DWARF (virus) was found in 9 fields in Ont.; the highest infection observed was 5% in a field of Dooley at Durham. Clover was present in the adjacent field. (O.W. Lachaine)

VIRUS DISEASES IN KATAHDIN. A virus disease, believed to be new to potatoes, was found in Katahdin. The disease is characterized by an intense mottling of the leaves accompanied by a blistering of the leaf surface. The virus is readily sap transmissible and gives reactions on standard defferentials resembling those of Hyoscyamus virus 3. The disease was found in a field of certified stock in York Co., N.B. (cf. Marion A. Hamilton, Ann. Appl. Biol. 19: 550-567. 1932 and F.M.L. Sheffield, ibid 25: 781-789. 1938)

A severe streak disease was found causing considerable damage in a field of Katahdin in Addington Co., Ont. The virus has been identified as a strong strain of Solanum virus 2 (rugose mosaic).

The Katahdin variety has a great deal of field resistance to Solanum virus 3 (mild mosaic), but it is susceptible to certain strains of Solanum virus 1, Solanum virus 2, and at least two other viruses not previously described as affecting potatoes.

Greenhouse tests over a period of 3 years have shown that Katahdin does not readily show leaf roll the first and second years, the symptoms being confined mainly to a rolling of the lower leaves. Up-to-date and certain other varieties believed to be carriers of leaf roll also behave in this manner. (D.J. MacLeod)

BLACK HEART (non-parasitic). An affected tuber of Chippewa was received from Clute, Ont. The potatoes were grown in heavy clay soil and harvested in wet weather. The bin became flooded at one end (H.N. Racicot). Several reports of black heart were received from P.E.I. growers late in the storage period. (R.R. Hurst)

BRUISE SPOT (mechanical injury to immature tubers). A shipment of potatoes from the Pike Lake District to the R.C.A.F. Depot at Saskatoon, Sask., was turned down because of the presence of numerous brown areas on the surface of the tubers. The trouble was apparently caused by rough handling which resulted in a bruising of the thin skin of the immature though moderately large tubers. This condition is not uncommon in Sask. in late-maturing varieties, or in seasons when the ripening period is prolonged. The bruised areas enlarge if the tubers are kept at moderately high temperatures and become irregular in outline. This is evidently the same trouble reported last year as Crusty Spot. (T.C. Vanterpool)

BORON DEFICIENCY. It has been observed that the leaves of Katahdin become severely rolled when the variety is grown on certain soils in N.B., while the leaves are normal when it is planted on other soils. The Chippewa variety also shows this tendency. Possibly these varieties are more sensitive to boron deficiency than the older varieties, for when Katahdin was grown on a boron deficient soil at the Laboratory, Fredericton, the leaves were extremely rolled, while Green Mountain in adjacent plots showed almost no rolling of the leaves. (D.J. MacLeod)

GIANT HILL was reported in 20.8% of the fields inspected in B.C., but no fields were rejected on account of its presence (H.S. MacLeod). About 1% of the plants were suspected of being affected by giant hill in a few fields of Green Mountain in Kings Co., N.S. (W.K. McCulloch)

HOLLOW HEART (non-parasitic) was severe in Man. in one field of Irish Cobbler, which had passed field inspection; tubers weighing as little as 8 oz. were affected (J.W. Scannell). Hollow heart was observed in N.B. in one field, where soil fertility was high and the plants had made unusually vigorous growth (C.H. Godwin). Hollow heart was present occasionally in the 1942 crop in P.E.I.; in one field of Sebago 0.5% of the tubers were affected. (R.R. Hurst)

FAILURE OF TOP FORMATION (non-parasitic). The Chippewa variety, in common with Katahdin, apparently possesses a tendency to produce small tubers rather than tops when the sets are planted. Seed from a lot grown near Saanichton, B.C., were planted in a garden near the Station on April 10, April 22, and May 1. The respective stands were 100%, 83%, and 76%, and all seed pieces that failed to grow were found on examination to consist of a mass of small tubers and no stalks. A survey conducted by Mr. E.R. Bewell disclosed that all the Chippewa seed grown on Vancouver Island, which matured very early in 1941 under abnormally hot, dry conditions, gave imperfect stands due to this condition, and in every case the late plantings gave the poorest stands. Potatoes of the same variety grown at Grand Forks and Chilliwack in the Fraser Valley gave good stands, apparently because the tubers matured later than the Vancouver crops (W. Newton). A slight amount of this trouble was found in a field of Katahdin at Halls Harbour, N.S. (G.W. Hope)

NET NECROSIS was not as prevalent as in many previous years in B.C. (H.S. MacLeod). Certified seed stocks in Alta., which have, so far, been inspected in the bin, have been very free from net necrosis (J.W. Marritt). Net necrosis was reported in a few lots of seed from Nicolet Co., Que. Over 50% of these lots were rejected for leaf roll when inspected in the field. Affected tubers were sent to this office and were planted in the greenhouse and field; more than 25% of the affected tubers produced plants affected by leaf roll (B. Baribeau). Net necrosis was still serious in seed and table stock grown in the Saint John River Valley, N.B.; in other areas, where the disease has not been considered severe, more cases were reported this year than in 1941 (C.H. Godwin). A sample of 25 tubers of Green Mountain showing necrosis was critically studied at Kentville, N.S. Seven weeks after planting, all tubers produced plants showing leaf roll in one or both units from each tuber. In addition to leaf roll, 22 tubers yielded plants showing more or less severe symptoms of mosaic. Microscopic examination of preparations made from the tissue adjacent to eyes revealed a necrosis of phloem and the adjacent parenchyma tissue. No xylem necrosis was observed except in tissue of some tubers, immediately adjacent to the stolon. Tissue plantings were nearly all negative. The owner of the seed recently examined the plants and remarked on their similarity to the plants in a field adjacent to the one from which the sample was taken in 1941 (J.F. Hockey). Net necrosis was severe in one field in P.E.I. where 75% of the tubers were affected; otherwise very little occurred. (S.G. Peppin)

SPRAIN was severe in one field in P.E.I., where 75% of the tubers were affected; a slight amount occurred in other fields and was found only in the extreme western end of the province. (S.G. Peppin)

STEM-END BROWNING is still a serious trouble in Green Mountain and to a lesser extent in other varieties in N.B.; occasionally the crop was a total loss (C.H. Godwin). Stem-end browning was found in almost every lot of Irish Cobbler grown in P.E.I. in 1941. All seed was so seriously affected that no seed lots could be found quite free from it and plantings of this variety contained, of necessity, affected tubers. Stem-end browning had not developed in the 1942 seed crop by December, when tubers were last examined. (S.G. Peppin & R.R. Hurst)

PUMPKIN

MOSAIC (virus). All plants of Royal Acorn were affected but suffered little injury in a plot at the Botanical Garden, Montreal, Que. (J.E. Jacques)

RADISH

YELLOWS (Callistephus virus 1). Two severely infected plants were found in a garden at the Station, Fredericton, N.B.; the plants were dwarfed and the inflorescence was distorted and sterile. (D.J. MacLeod)

RHUBARB

LEAF SPOT (Phyllosticta straminella). A moderate infection was present on the leaves of some varieties at Brandon, Man. (W.L. Gordon)

CROWN ROT (cause unknown) moderately affected rhubarb in the gardens at Lacombe, Alta.

SALSIFY

WHITE RUST (Cystopus cubicus). All the plants of Mammoth Sandwich Island salsify were more or less affected in the Botanical Garden, Montreal, Que.; removal of the diseased leaves apparently checked further spread (J.E. Jacques). Traces of white rust were present in a planting of salsify in Rouville Co. (E. Lavallée)

SPINACH

YELLOWS (Fusarium sp.) affected 20% of the plants in a garden in Lincoln Co., Ont.; diseased plants were so chlorotic and stunted as to be unfit for sale. (J.K. Richardson)

DOWNY MILDEW (Peronospora Spinaciae) was moderate and caused slight damage in a field in Lincoln Co., Ont. (G.C. Chamberlain). One field was slightly affected at St. Martin, Que. (E. Lavallée)

SQUASH

BACTERIAL WILT (Erwinia tracheiphila) infection was a trace to slight in the plots at Ste. Anne de la Pocatière, Que. (R.O. Lachance)

MOSAIC (virus). All plants of Golden Summer Crookneck squash were affected, but suffered little injury in the Botanical Garden, Montreal, Que. (J.E. Jacques)

SWEET CORN

?BACTERIAL STALK ROT (Phytomonas dissolvens). There appeared recently at the Horticultural Station, Vineland Station, Ont., a new disease, which was quite prevalent in some hybrid lines of corn. The symptoms differ somewhat from those described for bacterial stalk rot. The disease affects primarily the leaf

sheaths and occasionally the ears. External symptoms appear as light to dark brown discolorations and water-soaked areas on the leaf sheaths. Later, some necrosis develops accompanied by blanching and drying of the centre of the lesion. Bacteria have been found upon a microscopic examination of the diseased tissue and have been readily isolated. (C.D. McKeen)

RUST (Puccinia Sorghi) was apparently uncommon in Man. this year; a mere trace was present at Morden (W.L. Gordon). Several fields near the Laboratory, St. Catharines, Ont., were slightly infected (J.K. Richardson). Rust infection was a trace to heavy on Golden Bantam and other varieties in Queens Co., P.E.I. (R.R. Hurst)

SMUT (Ustilago Zeae). Infection was slight at Brandon, Man., being less than in some years; general and moderate at Morden (W.L. Gordon); infection quite general in Ont., although less severe than usual in Lincoln Co. (J.K. Richardson). A single plant of variegated maize, Zea Mays var. japonica f. quadricolor, was attacked in the Botanical Garden, Montreal, Que. (J.E. Jacques). A few cases of smut were reported in Que. this year. (O. Caron)

SWEET POTATO

JAVA BLACK ROT (Diplodia tubericola). Sweet potatoes affected by a severe storage rot were received from a wholesale firm in Calgary, Alta. Isolations from the potatoes yielded cultures of Diplodia tubericola, which proved to be pathogenic when inoculated into sound specimens. (J.G. Grimble)

SWISS CHARD

LEAF SPOT (Phoma Betae) was found on a few leaves in a crop grown for seed at the University, Vancouver, B.C.; the spots were associated with those caused by Ramularia beticola. This pathogen has not been previously reported on swiss chard in Canada. (W. Jones)

LEAF SPOT (Ramularia beticola) was general on the leaves and occasionally on the stems of 2 seed crops grown at the University, Vancouver, B.C. and in North Saanich Co. respectively. The fungus has not been reported previously in Canada on swiss chard. (W. Jones)

RUST (Uromyces Betae) slightly infected a crop grown for seed in North Saanich Co., B.C. (W. Jones)

TOBACCO

These records, prepared by Dr. L.W. Koch, include information obtained by Mr. F.A. Stinson in the New Tobacco Belt of Ontario and from Mr. R. Bordeleau for the Quebec tobacco-growing areas.

Diseases in the Seedbed

BLACK LEG (Erwinia ?aroideae). A few cases were observed in the Woodslee area of Essex Co., Ont., during the transplanting season. It is nearly always confused by growers with damping-off.

NEMATODES (Heterodera marioni) were observed in one Essex Co. seedbed. Cucumbers had been grown in some of the soil during the previous year. Seedlings were chlorotic and stunted.

DAMPING-OFF (Rhizoctonia and Pythium sp.). Damage in Ont. was observed chiefly in cloth-covered burley seedbeds in Essex and Kent counties. Some damage also occurred in Norfolk Co. during the transplanting season. On the whole, this disease was less serious than in 1941 in Ont. In the southern tobacco-growing area of Que., however, this disease took a high toll of seedlings.

BLACK ROOT ROT (Thielaviopsis basicola). Damage from this disease was generally moderate throughout the old and new tobacco belts of Ont. However, in localized areas of Norfolk Co., black root rot was observed to be present in some greenhouses. It was found that mild, general infections in seedbeds were almost invariably overlooked by growers. In the northern tobacco-growing section of Que., black root rot was the most destructive disease of seedlings and infection was widespread. This is due largely to the fact that most of the varieties grown there are completely susceptible, and besides, disinfection of seedbed soil and frames is not generally practised.

CHLOROSIS (chilling). During the past year, as usual, some complaints were received of this seedling trouble which appears as a distinct yellowing of the inside "bud" leaves at the four to six leaf stage. Careful observations during the past four years have strongly indicated this trouble to be due to chilling of seedlings at night. Recovery nearly always follows within a few days to a week with no permanent ill effects.

YELLOW PATCH (unbalanced fertilization) was the most damaging disease of seedlings during 1942 in both the old and new tobacco belts of Ont. The disease is characterized by dwarfing and yellowing of the tops, rotting of the roots, and patchy appearance of the affected seedbeds. Damage varied from a milk stunting and yellowing in the affected parts of seedbeds to the death of all seedlings in entire beds. In all severe cases of yellow patch, excessive or improper fertilization of seedlings was practised. In one case, a "high-nitrogen" vegetable fertilizer had been used and in several other cases, sheep manure.

MUSHROOMS. In Kent county, Ont., fruiting bodies of fleshy fungi caused damage in some seedbeds. Occasionally responsibility could be assigned to manure, even though in small quantities, placed underneath the seedbed soil. Affected seedlings were chlorotic and, in some cases, mildly stunted.

Diseases in the Field

NEMATODES (Heterodera marioni) were observed in plants in two fields in Norfolk Co., Ont. One of these was at the Delhi Sub-station in the same general area where nematodes had been observed in previous years. In no case was damage severe, and in some cases infection was unaccompanied by noticeable stunting.

ANGULAR LEAF SPOT (Pseudomonas angulata (Fromme & Murr.) Stev. Pl. Dis. Fungi 21. 1925, Bacterium angulatum Fromme & Murray, Journ. Agr. Res. 16: 226. 1919; Starr & Burkh. Phytopath. 32: 601. 1942). Mild damage from this disease was observed towards the end of the harvesting season in Essex and Kent counties, Ont. Severe damage to some crops was also observed near L'Assomption, Que.

WISCONSIN LEAF SPOT (Pseudomonas mellea Johnson, Journ. Agr. Res. 23: 489. 1923; Bacterium melleum Johnson l.c.; Starr et al. Phytopath. 33: 316. 1943) was recognized for the first time in Canada during the past year where it occurred in epidemic form in the southern tobacco-growing area of Que. It is believed, however, that it has been present in this province prior to 1942. Many crops of cigar tobacco were affected late in the season and damage varied widely. The necrotic leaf areas resulting from infection by this organism were often three-eighths to one-half inch in diameter and in later stages became dry and dropped out.

SORE SHIN (Rhizoctonia Solani) again caused damage soon after transplanting in Essex Co., Ont. This was the second year this disease has caused damage in fields of flue-cured tobacco on very light soil. There appears to be a correlation between incidence of this disease and the ploughing-under of heavy crops of rye.

LEAF ROT (Rhizopus Oryzae Went & Prinson Geerlings). In the Delhi distruct, Norfolk Co., Ont., some loss was experienced from a rotting of flue-cured tobacco in the early stages of curing. Isolations yielded Rhizopus Oryzae in all cases. The species was identified by Victor M. Cutter, Jr., Cornell University.

BLACK ROOT ROT (Thielaviopsis basicola) caused moderate damage in Essex Co., Ont., parts of Norfolk Co., and in both tobacco-growing areas of Que. Green Briar appeared to suffer more than any other variety in Essex Co. In a field test for varietal susceptibility of flue varieties in Norfolk Co., Silver Dollar was the only one of seven varieties tested, which showed moderate resistance in naturally-infested soil.

MOSAIC (virus). In both the old and new tobacco belts of Ont., mosaic continued to cause some damage in flue varieties, particularly where two successive crops of tobacco were grown on the same field. Elsewhere, infection was usually limited to scattered plants or localized groups of plants. In one case, 80% of the plants in a three-acre plot of flue tobacco in Essex Co. showed symptoms of mosaic less than 3 weeks after planting. Infection in this instance proved to have arisen from a preceding crop of tobacco on the field which showed a high percentage of infection towards the end of the season.

RING SPOT (virus). Groups of infected plants were observed in two fields of burley tobacco in Essex Co., Ont. Elsewhere, infection was limited to scattered plants in different fields.

STREAK (virus) was less prevalent than during 1941; scattered infected plants were observed in some fields in Essex and Kent counties, Ont., particularly in the latter.

BROWN ROOT ROT (cause undetermined) caused some damage on burley tobacco in Essex Co., Ont., where corn had been the preceding crop. The varieties Harrow Velvet and Halley's Special were chiefly affected. In laboratory plots at Harrow, the variety Green Briar revealed a high degree of resistance.

Additional Observations

MOSAIC (virus). J.H.H. Phillips (Can. Journ. Res. Sec. C, 20: 329-335. 1942) has made a special study of the occurrence of cucumber mosaic in tobacco.

He describes 3 strains of cucumber mosaic which occur in Ont. and Que., as follows: "Though cucumber mosaic occurs in both the old and new tobacco belts in Ont., it does not appear to be widespread or cause much damage to the crop. In Que., however, where tobacco is grown in comparatively small plots, often adjacent to vegetable crops, such as potatoes, cucumbers, tomatoes, etc., cucumber mosaic on tobacco is more prevalent." "Certain strains of cucumber mosaic virus were found capable of causing severe injury to tobacco while other strains cause little or no injury beyond mild stunting. Because of its superficial resemblance to tobacco mosaic, many growers in Ont. and Que. are not aware of the occurrence of this disease on tobacco." Phillips compares the symptoms of cucumber mosaic on tobacco with those of tobacco mosaic. As he points out, "Unlike tobacco mosaic which persists over winter in the soil and is spread mainly by contact, cucumber mosaic is spread by insects from overwintering perennial hosts. It is therefore apparent that control measures as applied to tobacco mosaic would not be effective in controlling outbreaks of cucumber mosaic." This appears to be the first time that cucumber mosaic has been recognized on tobacco in Canada. (I.L. Conners)

Some plants of the following varieties were found affected at the Botanical Garden, Montreal, Que.; Quesnel, Canelle, Grand Rouge, Petit Rouge, Canadien and Connecticut; the leaves were sometimes badly distorted. One plant of Nicotiana sylvestris also showed a mottling on the young leaves (J.E. Jacques). Mosaic was reported on tobacco in Rouville and in the Lake St. John district. (O. Caron)

TOMATO

EARLY BLIGHT (Alternaria Solani) was general on Vancouver Island and the lower mainland, B.C., and caused considerable damage to the foliage of outdoor crops; it is difficult to control, although spraying with Bordeaux checks its spread (W. Jones). Early blight was found wherever tomatoes were inspected in Ont., and it appeared to cause more defoliation in the Niagara Peninsula than Septoria leaf spot. By mid-season, many plantings were almost devoid of foliage with the result that the fruit was a very poor quality (J.K. Richardson). A 5% infection was observed at L'Assomption, Que.; damage was negligible (L.T. Richardson). Early blight was observed in several gardens and was reported from others in P.E.I., but infection was heavy only in the Laboratory greenhouse. (R.R. Hurst)

LEAF MOULD (Cladosporium fulvum) was found in a greenhouse at Ponoka, Alta. (M.W. Cormack). Leaf mould became severe in October in numerous greenhouses of the Leamington area, Ont., where Vetomold was being grown. In a few greenhouses where the New Improved Vetomold, V121, was used, the new variety was showing a high degree of resistance to the disease (L.W. Koch). A small amount of leaf mould developed in the Laboratory greenhouse, Charlottetown, P.E.I.; infection was frequently heavy late in the season out of doors (R.R. Hurst). Mr. A.T. Pugsley, Waite Agr. Research Institute, Adelaide, South Australia (letter, Nov. 3, 1942), reports: "For two years now we have grown the Vetomold tomato variety in our glasshouses and in each season it has remained free." Dr. Bailey has also written that he has received reports from England that Vetomold has remained resistant to leaf mould in that country. (I.L. Conners)

ANTHRACNOSE (Colletotrichum phomoides) infected up to 30% of the fruit on late varieties in Essex and Kent counties, Ont.; the damage was moderate (L.W. Koch). Again this year there was some infection of fruit by anthracnose

in Lincoln Co., but the loss was small because the disease appeared to be confined to over-ripe fruit. (J.K. Richardson)

WILT (Fusarium oxysporum) caused appreciable loss of plants which had been raised in the Laboratory greenhouse, and then transplanted to a field at Wolfville, N.S.; the land had received a thin application of green manure. (J.F. Hockey)

WILT (Fusarium sp.) affected 1-2% of the plants which wilted and died, in a field at Burlington, Ont. (G.C. Chamberlain). Wilt severely affected 15 plants in the Laboratory greenhouse, Charlottetown, P.E.I.; Fusarium was easily isolated; soil was light and contained too much leaf mould and the temperature was high. (R.R. Hurst)

NAIL HEAD SPOT (Macrosporium tomato) infection was up to 5% and damage moderate in a field in Essex Co., Ont. (L.W. Koch)

BACTERIAL SPECK (Pseudomonas tomato (Okabe) Starr et al. Phytopath. 33: 316. 1943; Bacterium tomato Okabe, Journ. Soc. Trop. Agr. Formosa 5: 32. 1933). A trace to slight infection was observed on scattered fruits at Morden, Man. (W.L. Gordon)

LATE BLIGHT (Phytophthora infestans), as a fruit rot, caused considerable damage in the experimental plots at Ridgetown, Ont.; infection apparently came from an adjacent potato field (J.K. Richardson). Diseased fruit were received from North Bay (L.T. Richardson). Market gardeners who failed to protect their tomatoes or were careless in treating, suffered heavy losses about Quebec City, Que. Repeated and thorough applications of Bordeaux mixture were quite effective (O. Caron). Late blight was very severe all around the Montreal district; in many fields infection was high and damage severe (E. Lavallée). Specimens were received from the Three Rivers and Montreal districts; the disease also caused slight damage around Joliette (C. Perrault). Diseased specimens were received from Sillery and Dunham. (L.T. Richardson)

PHYTOPHTHORA STEM and FRUIT ROT (P. parasitica) was found affecting plants received from the Rideau Gardens, Ottawa, Ont. The firm reported a loss of 20,000-25,000 tomato plants of a late variety ready to transplant into the field out of 75,000. The disease was encountered first in 1940 and has increased in severity each year since (J.W. Groves and L.T. Richardson). According to L.T. Richardson (Can. Journ. Res. Sec. C, 19: 446-483. 1941) the disease first came to his notice in the Experiment Station greenhouses, Vineland, Ont., in the summer of 1937. Since then it has appeared in several greenhouses in that district and in one outdoor crop; losses in some instances were very heavy. It was also known from cultures from the Okanagan Valley, B.C., where it was reported by Dr. R.E. Fitzpatrick in 1940. A detailed account of the disease is given. (I.L. Conners)

FRUIT ROT (Phytophthora sp.) was found on fruit sent to the Laboratory from Canoe, B.C. (G.E. Woolliams)

LEAF SPOT (Septoria Lycopersici). A slight infection was general at Brandon, Man., with a heavy infection on the leaves of some varieties (W.L. Gordon). This disease became epidemic on the early field crop in Essex Co., Ont., towards the end of the harvesting period (L.W. Koch). Leaf spot was general throughout the Niagara Peninsula and the plants became defoliated somewhat earlier

than usual. In many plants, severe stem lesions were observed and infection of the fruit was also noted several times (J.K. Richardson). Affected leaves were received from a greenhouse at L'Assomption, Que. (L.T. Richardson). Leaf spot was prevalent at Waterville, N.S., in several fields set out with plants from the same greenhouse. The seed was supposedly treated, but the plants were raised in soil that had grown tomatoes the previous year. Later some fields were defoliated and the crop was reduced 25% (J.F. Hockey). The disease was seen once in P.E.I. (R.R. Hurst)

WILT (Verticillium albo-atrum) caused slight damage in greenhouses at Redcliff, Alta. (J.G. Grimble)

BACTERIAL SPOT (Xanthomonas vesicatoria cf. p. 50). According to M.W. Gardner & J.B. Kendrick (Journ. Agr. Res. 21(2): 123-156. 1921), the disease was first noted in Canada in 1918 by W.A. McCubbin (Dom. Dept. Agr. ser. 2, Bull. 35: 15. 1919). (I.L. Conners)

BLOTCHY RIPENING (virus). A sample of imported tomatoes from the Fruit Inspection Office, Toronto, Ont., showed numerous yellow blotchy markings and ring spot. This condition is suspected to have been brought about by severe aucuba mosaic. (G.C. Chamberlain)

MOSAIC (virus). All plants affected in a commercial field of Clark's Early at Rutland, B.C.; plants poorly developed and crop light and of inferior quality (G.E. Woolliams). A few plants of Grand Rapids were found in a greenhouse in Welland Co., Ont., in March showing the indistinct green vein-banding symptoms of potato X virus. This is the first time this virus alone has been found on tomato in Ont. (G.C. Chamberlain). Mosaic affected 70% of the Harkness plants in a field in Lincoln Co.; the affected plants were from one source of seed, while a second planting from a different source was free (G.C. Chamberlain). A slight infection was present in a small planting of seed tomatoes of Early Rutgers in Lincoln Co. (J.K. Richardson). Mosaic affected up to 90% of the tomatoes and caused moderate damage in early tomatoes in Essex Co. (L.W. Koch). All plants were affected by mosaic in a planting at Verdun, Que.; fruit were fewer and smaller on the diseased plants (E. Lavallée). The terminal leaves of one or two plants of Yellow and Red pear-tomato showed a mottling in the Botanical Gardens, Montreal (J.E. Jacques). Three plants in a garden at the Station Fredericton, N.B. and 6 plants in a ½-acre field in Sunbury Co. were affected by mosaic; the virus was identified as Solanum virus 1, strain L. Mosaic affected 3% of the plants in a 2-acre field in Sunbury Co. and caused slight damage; the virus was identified as Nicotiana virus 1 (D.J. MacLeod). Traces of mosaic were present on all varieties observed in Queens Co., P.E.I. (R.R. Hurst)

SHOE STRING (cucumber mosaic virus) severely affected several plants in a ½-acre field of John Baer in Lincoln Co., Ont. (J.K. Richardson)

SPOTTED WILT (virus). A trace was found on most varieties in the plots at Lethbridge, Alta. (M.W. Cormack)

STREAK (virus) affected 2-3% of the plants in a greenhouse in Welland Co. Ont., in March and caused moderate stunting of the plants; the disease was due to a combination of tobacco mosaic and potato X virus. A few plants were also affected by potato X virus alone (cf. mosaic) (G.C. Chamberlain). Streak affected some plants in the Laboratory greenhouse, Charlottetown, P.E.I. (R.R. Hurst)

YELLOWS (beet curly top virus) was prevalent and destructive throughout the southern interior of B.C. in 1941, but most fields were free from the disease in 1942. (G.E. Woolliams)

PURPLE TOP (?Beta virus 1) affected 1% of the plants in a 2-acre field in Sunbury Co., N.B. Two affected plants were also found in a garden at the Station, Fredericton. The principal symptoms were an inward rolling of the leaflets along the mid rib; petiole and midrib frequently curved downward giving the leaf an appearance of drooping, but not wilting. The affected leaves were somewhat thickened and crisp. They assumed later a yellow colour with purple veins. The stems became hollow through the drying of the pith. After the first appearance of these foliage symptoms, the plant ceased growing and assumed a staring upright appearance. Affected plants usually died, the leaves and stems turning brown. A similar condition was found in Polygonum sp. (smartweed) growing in quantity near the tomato field in which the disease was discovered (D.J. MacLeod). An average of 1% of the plants in 4 gardens in Queens Co., P.E.I., were affected. (R.R. Hurst)

BLOSSOM-END ROT (non-parasitic) was general and severe in a few rows in Clark's Early A at Duncan, B.C. (W. Jones). The trouble severely affected 160 plants in a private garden at Britannia, Ont.; weather had been dry. The garden is on heavy clay and received a liberal dressing of cow manure during the fall and winter, which was worked in this spring (I.L. Conners). Affected specimens were received from Ottawa and Limoges, Ont. (L.T. Richardson). Many specimens were brought to the office from the Montreal District, Que., at the beginning of the harvesting period (E. Lavallée). Affected specimens were received from Beauprairie, Montreal and Sillery (L.T. Richardson). According to reports and specimens received, some loss was suffered from the trouble in various localities in Que.; it was generally followed by soft rot as the vines are usually not staked (C. Perrault). Blossom-end rot was very prevalent on light soils in N.S. and 40% loss occurred in some plantings (J.F. Hockey). Little blossom-end rot was found in unstaked tomatoes in P.E.I., but it was frequently very destructive where the vines were staked. (R.R. Hurst)

MANGANESE DEFICIENCY. A trace of suspected manganese deficiency was encountered in a greenhouse on Vetomold 121 in Lincoln Co., Ont. The plants showed a yellowing of the central part of the plant, the tip leaves being slightly mottled and the lower leaves normal green. The plants seemed to outgrow the condition to a large extent. (G.C. Chamberlain).

OEDEMA (non-parasitic). Some 75% of the plants of Vetomold 121 in one large greenhouse in Lincoln Co., Ont. were affected when the plants were 6-8" high. With increased ventilation and reduced watering, the affected plants made a complete recovery. (G.C. Chamberlain)

TURNIP

SCAB (Actinomyces scabies). A moderate infection was observed in Swede turnips in Kamouraska and L'Islet counties, Que. (R.O. Lachance). Scab was more prevalent than I have ever known it to be in P.E.I.; in one field the turnips were unfit for table use. (R.R. Hurst)

BLACK LEAF SPOT (Alternaria circinans) was present on the outer leaves of ruebstiel (Brassica rapa var. perviridis) and rather severely attacked wild turnip (B. campestris) in the Botanical Garden, Montreal, Que. (J.E. Jacques)

GREY LEAF SPOT (Alternaria Brassicae) heavily spotted the outer leaves of Purple Top Milan turnip at the Botanical Garden, Montreal, Que. (J.E. Jacques). A trace of infection occurred on pods and aborted blossoms of semi-sterile plants of Wilhelmsburger Swede at Nappan, N.S. (J.F. Hockey)

WHITE LEAF SPOT (Cercosporella Brassicae (Fautr. & Roum.) v. Höhn Ann. Myc. 22: 193. 1924; Cylindrosporium Brassicae Fautr. & Roum. Rev. Mycol. 22: 81. 1891; Cercosporella albomaculans (Ell. & Ev.) Sacc. Syl. 11:606. 1895; Cercospora albomaculans Ell. & Ev. Proc. Acad. Nat. Sci. Phil. 1894) was very prevalent in a field near Plattsville, Ont.; conidia were being produced in abundance about Oct. 1 (J.D. MacLachlan). A moderate infection was present in a field of Purple King in the same district in August, while other fields in the vicinity were slightly infected. (J.K. Richardson)

SOFT ROT (Erwinia carotovora) occurred usually in fields where black rot (q.v.) was prevalent; the disease apparently was secondary to black rot (J.D. MacLachlan). About 10% of the roots were affected by soft rot in a planting of Laurentian at the Laboratory, St. Catharines, Ont.; in most cases it followed black rot. (J.K. Richardson)

POWDERY MILDEW (Erysiphe Polygoni) slightly infected a planting of Laurentian at the Laboratory, St. Catharines, Ont. (J.K. Richardson)

DOWNY MILDEW (Peronospora Brassicae) slightly infected turnips on one farm in Ont. on Aug. 20; the fungus was sporulating freely at the time (J.D. MacLachlan). A trace of downy mildew occurred on the foliage of Ditmars seed plants at Deep Brook, N.S. on June 22. It was also found on a few plants of wild radish, Raphanus Raphanistrum, at Centreville on Aug. 3. (J.F. Hockey)

BLACK LEG (Phoma lingam) affected 25% of roots in a ½-acre field at Ste. Agathe, Que.; the disease developed in patches (E. Lavallée). Black leg caused a loss of 0-30% of seed roots of Ditmars in storage at Deep Brook, N.S.; secondary rots were also present in many cases. (J.F. Hockey)

CLUB ROOT (Plasmodiophora Brassicae). An affected specimen was received from Knowlton, Que. (H.N. Racicot). Club root completely destroyed an acre field of swede turnips in P.E.I.; in others infection varied from a trace to 50% of roots. (R.R. Hurst)

BLACK ROT (Xanthomonas campestris; cf. p. 28). In many fields of Laurentian and Purple King near Hickson, Ont., symptoms of black rot were apparent both on the foliage and in the roots in September and October; it is feared that the disease will increase and cause even more damage in storage, particularly in waxed stock (J.K. Richardson). Black rot occurred sporadically in the Guelph district, Ont., but in some fields almost all the leaves and 30% of the roots were diseased. (J.D. MacLachlan)

MOSAIC (virus) affected 3-7% of the seed plants in a field of Ditmars planted with roots, which showed mosaic in 1941, at Deep Brook, N.S. Affected plants appear slightly smaller and the yield of seed was lighter than that of normal plants. Several wild radish, Raphanus Raphanistrum, were also affected in the same field (J.F. Hockey). Affected specimens were received from Mr. Hockey for examination. The principal symptoms are a clearing of the veins, followed by a chlorotic mottling and distortion of the leaves. The virus was transmitted to

turnips by Myzus persicae. All attempts to transmit the virus by sap inoculation to Datura Stramonium, Capsicum annuum, Nicotiana Tabacum, N. glutinosa and Solanum nodiflorum were unsuccessful. The virus resembles Brassica virus 3. The virus was sap-transmitted with difficulty to turnip by the use of carborundum powder. (D.J. MacLeod)

BROWN HEART or WATER CORE (boron deficiency) occurred sporadically in southwestern Ont., but in some fields more than 90% of the roots were affected (J.D. MacLachlan). In southwestern Ont., applications of borax to the soil have not given consistent control of brown heart in rutabaga (J.D. MacLachlan, Phytopath. 33: 8-9. 1943) probably because of the high lime content of the soil. Practically complete control was obtained by 2 foliar spray applications of a 2% aqueous solution of borax and ¼% Orvus as a spreader applied: (1) when roots are 1-2" in diam. and (2) one month later.

As the result of a test conducted at Ottawa in 1941, the varieties, Canadian Gem, Perfect Model and Cannell's Purple King were all significantly more affected by brown heart than other varieties of swedes such as Laurentian, Wilhelmsburger, Ditmars, and Acadian. (T.M. Stevenson)

Brown heart was present in swede turnips on 50% of the farms surveyed in L'Islet Co., Que.; growers failed to secure fertilizers containing the proper percentage of borax; in general the infection was slight (R.O. Lachance). Brown heart affected up to 50% of the roots of several varieties and selections of swede turnips in Jacques Cartier Co.; the season was very dry (J.G. Coulson). Brown heart was found affecting 10-20% of the roots in two fields in N.S., one at Baxters Harbour and the other at Lindsay (W.K. McCulloch). Brown heart affected up to 100% of the roots of swede turnips in some fields in P.E.I. The disorder has become very troublesome again in some areas. Apparently this increase is due to the farmers not keeping up their applications of boron. (R.R. Hurst)

FALSE BLOSSOM and STERILITY (cause undetermined) was common in swede turnips being grown for seed in N.B.; 2 to 65% of the plants were affected. It also affected 25% of the plants of bird rape, Brassica campestris, in a potato field at Grand Falls (D.J. MacLeod). The trouble was reported to have been quite serious in some fields in P.E.I.

VEGETABLE MARROW

ROT (Sclerotinia sclerotiorum) causes slight damage to the fruit in one garden in Edmonton.

WILT caused severe damage in a ½-acre planting at Brooks, Alta. Isolations were made and proved pathogenic to seedlings of several cucurbits in greenhouse pot culture. The pathogen was identified as Fusarium sambucinum f. 6 by W.L. Gordon (L.E. Tyner)

MOSAIC (virus) affected all plants of Long White Bush and Italian Cocozelle grown at the Botanical Garden, Montreal, Que., but caused little injury. (J.E. Jacques)

FASCIATION. Fasciated plants were found in several varieties being grown for verification at the Station, Summerland, B.C. (G.E. Woolliams)

SEED-BORNE PATHOGENS OF VEGETABLES: Samples of vegetable seed were tested by sowing the seed in steam-sterilized soil in the Laboratory greenhouse, Saanichton, B.C., and examining the seedlings for disease. A large porportion of the samples were "of high quality from the standpoint of freedom from disease and considered entirely suitable for use". However, a portion of the samples, notably of cauliflower, radish, and carrot were carrying seed-borne pathogens. The unfavorable weather conditions at harvest time in 1941 were reflected in an increased amount of seedling blight in radish and carrot. Of 10 samples of radish seed of the 1940 crop, 7 were clean and the other 3 yielded 1% Alternaria-blighted seedlings. Of 24 samples of the 1941 crop, 5 were clean and percentage of blighted seedlings obtained from the remainder were: 7 with 1-2%, 5 with 3-10%, 6 with 11-20%, and 1 with 27%. Of the 14 samples of carrot (q.v.) seed from the 1940 crop, 7 were clean and the remainder yielded 1-4% of seedlings blighted by Alternaria radicina. Of the 14 samples of the 1941 crop, 2 were clean, 1 with 1%, 1 with 7%, and 10 with 14-27%. Cauliflower seed, on the other hand, was more heavily infected in 1940 than in 1941, but it is believed that conditions for drying this seed was more favourable in 1941 than in the previous year. In 1940, in 4 samples examined, seedling blight due to Alternaria was 2%, 12%, 23% and 31% respectively. In 1941 of the 11 samples, 2 were clean, 8 showed 2-3% blight, and one 6%. This disease can be troublesome to the seed grower because of the loss of young seedlings being grown in the greenhouse or cold frame during the winter to be planted out next spring for seed production. Hot water treatment (15 min. at 122°F.) followed by Semesan dust, gives excellent control and in good seed reduces the germination but slightly. The same treatment has been effective with radish seed, but it causes definite injury where the seed coats are loose or where the seed is in poor condition. For carrot, seed treatment with 1% Ceresan, Semesan Jr., and Spergon, gave effective control. (I. Mounce & J.E. Bosher)

IV. DISEASES OF FRUIT CROPS

APPLE

CROWN GALL (Agrobacterium tumefaciens; cf. p. 27). Galls were seen on a number of young trees received for planting at Ste. Anne de la Pocatiere, Que. (C. Perrault)

STORAGE ROT (Alternaria Mali) was found in Gravensteins in cold storage in Quebec, Que. (A. Payette)

CORE ROT (Alternaria sp.). Over 60% of Cortland apples in a box from Nicolet, Que., had a slight heart rot from which Alternaria sp. was isolated. The fungus seems to be a weak parasite that may have penetrated soon after blossoming. A similar trouble has previously been seen to a small extent in other varieties. (C. Perrault)

LEAF SPOT (Botrytis sp.). Spots were found on leaves in the Okanagan Valley, B.C., where blossom parts had lodged during prolonged wet weather. (R.E. Fitzpatrick)

FRUIT ROT (Botrytis cinerea) was found in cold-stored Wealthy at Ile-aux-Coudres, Que. (A. Payette). It was prevalent in fallen Dudley at Burton, N.B. in September. (S.F. Clarkson)

BLOSSOM BLIGHT (Cladosporium herbarum). Seventy per cent of blossoms near Cape Blomidon, N.S. failed to set fruit and were covered by this fungus. The blossom period was rainy and humid. (J.F. Hockey)

TWIG BLIGHT (Cytospora sp.) slightly affected a few young McIntosh trees at the Station, Fredericton, N.B. (S.F. Clarkson)

FIRE BLIGHT (Erwinia amylovora). Severe damage occurred in the orchard at the Station, Lethbridge, Alta., and many infected trees were removed and destroyed (M.W. Cormack). Heavy infection occurred on several seedlings in the selection block, University Gardens, Saskatoon, Sask. (R.C. Russell). Severe infection occurred on several varieties at Morden, Man., though the disease was less severe than in 1941 (W.L. Gordon). A specimen was received from Braeside, Ont. (H.N. Racicot). In November an orchard of Greening and Wagener at East Flamboro, Ont., was found to have widespread twig blight and many cankers; the orchard was close to an apiary (G.C. Chamberlain). In Que. fire blight was not severe in improved orchards generally; but untended trees in gardens, and along roadsides were heavily infected, notably on Ile d'Orleans and between Beaumont and Ste. Anne de la Pocatiere. (C. Perrault, R.O. Lachance, L.J.S. Laporte, O.Caron)

ROT (Fusarium sp.) was severe in a number of McIntosh fruits in Aug. at Springhill, N.B. (S.F. Clarkson)

ROT (Gloeosporium album) was found on Northern Spy from York Co., N.B. (S.F. Clarkson)

RUST (Gymnosporangium clavipes) lightly infected McIntosh, Cortland and Delicious at St. Catharines, Ont. (G.C. Chamberlain). A trace was found on Yellow Transparent, Alexander and Burgess crab in Kamouraska Co., Que. (C. Perrault, R.O. Lachance)

ANTHRACNOSE (Neofabraea malicorticis) was reported as severe on Lowland Raspberry; moderate on Grimes Golden, Spitzenburg, and Cox Orange; slight on Sandow, Goal, Rupert, Red Delicious; trace on Lubsk Queen and Delicious in coastal B.C. The disease is fairly common in neglected orchards (W. Jones). In the Okanagan Valley, B.C., anthracnose varies in severity with seasonal conditions; its occurrence was about normal this year. (H.R. McLarty)

PERENNIAL CANKER (Neofabraca perennans) is prevalent throughout the Okanagan district, B.C. but losses have been greatly reduced since the introduction of the woolly aphis parasite, Alphelinus wali. (H.R. McLarty)

BULL'S EYE ROT (Neofabraea malicorticis or N. perennans) was found damaging fruit injured by arsenical sprays, but was not serious in the Okanagan district, B.C. (H.R. McLarty)

STORAGE ROT (Penicillium sp.) affected a large percentage of a shipment of Northwest Greening from Prince Edward county, Ont. In some cases infection had occurred through wounds, but in others, no wounds were visible (H.N. Racicot). P. expansum was isolated from Gravensteins rotting in cold storage in Quebec, Que. (A. Payette)

FROG EYE SPOT (Phyllosticta limitata) was conspicuous, but not serious on McIntosh and Fameuse in a Northumberland Co., Ont., orchard. (G.C. Chamberlain)

LEAF SPOT (Physalospora obtusa) was moderately abundant on some trees at Morden, Man. (W.L. Gordon)

TWIG BLIGHT (Physalospora obtusa) severely damaged a few young McIntosh trees at the Experimental Station, Fredericton, N.B. (S.F. Clarkson, I.L. Conners)

CROWN ROT (Phytophthora Cactorum). It is estimated that at least 2% of the trees in the Okanagan Valley, B.C., are affected by crown rot. The incidence of the disease does not vary greatly from year to year, and no serious new outbreaks are reported this year. (R.E. Fitzpatrick). M.F. Welsh (Can. Journ. Res. C, 20:457-490, 1942) describes crown rot as it occurs in the irrigated orchards of B.C. It is confined to the bark below ground level and attacks trees of all ages and of all commercial varieties. Proof is given that Phytophthora Cactorum (L. & C.) Schroet. is the causal organism. Isolation of the pathogen is possible only from the margins of active lesions; secondary organisms seem to suppress it in rotted tissues.

POWDERY MILDEW (Podosphaera leucotricha) was common in garden orchards on Vancouver Island, and the lower mainland, B.C. Gravenstein, Grimes Golden, Jonathan, Cox Orange and King seemed to be most susceptible (W. Jones). Mildew was widespread in the Okanagan Valley, B.C. on foliage, but did little damage to fruit; it was occasionally severe enough on Jonathan foliage to

reduce the crop (R.E. Fitzpatrick). In Lincoln Co., Ont., the disease was seen on unsprayed Cortland trees and caused some twig stunting. (G.C. Chamberlain). In Rouville, Deux-Montagnes, and Brome counties, Que., mildew was serious in about 60% of the nurseries, but was not seen on orchard trees. (L.J.S. Laporte)

BRANCH ROT (Schizophyllum commune) slightly damaged a few crab-apple trees at Edmonton, Alta. (M.W. Cormack)

BROWN ROT (Sclerotinia fructicola) caused slight decay of McIntosh in Lincoln Co., Ont., following scab or mechanical injury (G.C. Chamberlain). The organism was also isolated from cold-stored apples grown at Frelighsburg, Que. (A. Payette)

SILVER LEAF (Stereum purpureum). A trace was found on Hibernal at Lacombe, Alta. (M.W. Cormack). In N.B. the leaves of a number of Cortland trees in York Co. were completely affected, and those of a few McIntosh were slightly affected; cankers were not found (S.F. Clarkson). One tree of Bishop Pippin in Kings Co., P.E.I. was completely affected. (R.R. Hurst)

SCAB (Venturia inaequalis) was common on Vancouver Island and the lower mainland, B.C., causing slight to moderate damage (W. Jones). It was prevalent in the Grand Forks area, where it is generally of minor importance, and caused heavy losses in fruit infection and defoliation; heavy prolonged spring rains were probably responsible. In the Salmon Arm region, the disease was exceptionally severe, especially on McIntosh Red, which, in some orchards was not picked because of the heavy damage; extremely wet spring weather disrupted the spray schedule (G.E. Woolliams). In Sask. a trace of scab was found in the University Garden, Saskatoon, (B.J. Sallans). Specimens and a report from Struan indicate fairly heavy infection on several varieties of crab (R.C. Russell, T.C. Vanterpool). A specimen was also received from Vibank (L.T. Richardson). A trace to slight infection on leaves and fruit is reported from Morden, Man., and moderate to heavy leaf infection, with occasional fruit spots, is reported in the University Garden, Winnipeg. (W.L. Gordon)

Scab was unusually serious in southwestern Ont. Mature ascospores were found on April 21 at St. Catharines, but dry weather delayed the initial discharge until May 4. The major discharge period was May 12-19; as full bloom was about May 15, considerable infection took place before the calyx spray could be applied. Primary infections appeared May 25. No ascospore discharge occurred from leaves sprayed with ½% Elgetol. In trees sprayed according to the calendar infection was 2-13%; in unsprayed trees it was 100%. McIntosh, Melba, Cortland and Fameuse were most severely attacked (G.C. Chamberlain, J.E. Howitt). McIntosh received from Carleton Co. on Dec. 1, showed late infections around the stem, which probably developed in storage. (H.N. Racicot)

In southwestern Que. scab caused little damage in well-sprayed orchards. Early in the season extra sprays had to be applied in southern districts because of continued rain. Some pinhead scab developed in August in orchards where lime sulphur had not been included in the apple maggot

sprays (L.J.S. Laporte). Scab was easily controlled along the lower St. Lawrence, owing to dry weather; but few apples escaped infection in unsprayed orchards. (C. Perrault, O. Caron)

In N.B. warm weather hastened tree development and resulted in early blossoming. Mature ascospores were found May 5 in the St. John River Valley. Initial ascospore discharge occurred on May 22. The critical period of spore discharge was May 23-26, during full bloom. Primary infections were recorded June 12 in York Co. and June 15 in Sunbury Co. Trees with heavy primary infection did not develop secondary infection until late in the season, owing to dry weather. (S.F. Clarkson)

The spring was about 2 weeks in advance of 1941 in the Annapolis Valley, N.S. Heavy ascospore discharges occurred May 8-9, May 16, and May 24-25, causing heavy infection in unsprayed orchards. The early season was favourable for spraying and good scab control was obtained in well-sprayed orchards. Ascospore discharge continued until June 22. (J.F. Hockey)

Ascospore discharge was heavy from June 2 onward in P.E.I. Scab was not serious in most of the larger orchards, where the full spray schedule was followed, although up to 25% leaf infection was observed. Fruit infection was severe in some small orchards and one grower suffered serious losses from scab on McIntosh Red. (R.R. Hurst)

MOSAIC (virus). A mosaic-like mottle was common on Bethel, in York, Sunbury and Carleton counties, N.B., but its cause is uncertain (D.J. MacLeod). A slight spread of mosaic occurred in orchards under observation in N.S. The crop was light on most affected trees and defoliation was appreciably hastened (J.F.Hockey). One affected McIntosh tree was seen near Charlottetown, P.E.I. (R.R.Hurst)

BITTER PIT (non-parasitic). A slight amount was seen on Northern Spy and Cox Orange at the Sidney Station, B.C. (W. Jones). Baxter, Wolfe River, and Northern Spy were severely affected in York Co., N.B. (J.L. Howatt). The disease was general in N.S.; up to 50% of the fruit were affected on some trees; conspicuous in Cox Orange, Northern Spy, Stark, Baldwin; also seen in Gravenstein, Blenheim, Ribston. (J.F. Hockey)

DROUGHT SPOT, CORKY CORE and DIE BACK (boron deficiency). "These troubles on apples in B.C. are now rarely encountered" (H.R. McLarty). Slight drought spot and corky core occurred at St. Joseph du Lac, Que., particularly on summer varieties, but to some extent on McIntosh (L.J.S. Laporte). Up to 100% Fameuse showed drought spot and up to 100% McIntosh showed corky core in part of the orchard at Macdonald College, Que; the season was abnormally dry (J.G. Coulson). Drought spot was severe on Cortland in York, Sunbury and Queens counties, N.B.; pitting occurred in the orchard and cork developed in storage; it is suggested that Cortland may serve as an indicator for boron-deficient soils. An abnormal type of cork caused slight damage to McIntosh in York Co.; a single sunken spot 3/8 inches diam. with cork beneath it was seen on each apple (S.F. Clarkson). Corky core affected up to 80% of some lots of Gravenstein and McIntosh in N.S. Drought spot symptoms were also seen on Northern Spy. This was the most severe outbreak ever experienced in N.S. (J.F. Hockey)

FLAT LIMB (scion-stock incompatibility) caused some breaking of limbs in bearing trees in N.S. It has been observed that young trees propagated by budding show practically no flat limb, in contrast to those propagated by scion grafts. (J.F. Hockey)

LEAF SCORCH (cause unknown). The situation in the Okanagan Valley, B.C., was similar to 1941; the disease was present but caused no serious damage. It has not responded to treatments of copper, iron, magnesium, manganese, sulphur and zinc. (R.E. Fitzpatrick)

SPRAY INJURY. Arsenical codling-moth sprays caused considerable damage in some orchards in the southern Okanagan Valley, B.C. Poor air drainage and wet weather seem to have been contributing factors. (R.E. Fitzpatrick)

STORAGE BREAKDOWN. A breakdown of the flesh of McIntosh apples from Carleton Co., Ont. was observed on December 1; the breakdown was mainly near the stem (H.N. Racicot). A lot of Spy and Russet, shipped from N.S. on December 19 and examined in Ottawa, December 30 showed senile breakdown; the fruits were over-mature; no organism was associated with the breakdown, which affected 3% of the Russet and 14% of the Spy. (H.N. Racicot)

WATER-CORE (non-parasitic) slightly affected King and Winter Banana varieties at Sidney Experimental Station, B.C. (W. Jones)

POTASH INJURY. Despite indication that ground sprays of muriated potash would not control ascospore development, a Sunbury, N.B., grower insisted that a muriate of potash spray plot be included with the scab control trials being run in his orchard. Sprays applied were: (1) delayed dormant ground cover of 50 lb. muriate of potash in 100 gal. water at 180 gal. per acre: (2) Prepink, muriate of potash 10 lb. in 100 gal. water; (3) Calyx, lime sulphur and iron sulphate; (4) 1st. cover, muriate of potash 10 lb. in 100 gal. water; (5) 2nd. cover, muriate of potash 10 lb. in 100 gal. water. Twig growth was stunted, foliage was sparse and leaves small or with severe marginal burning; 36% of the fruit was severely scabbed and only 2.3% entirely clean. (S.F. Clarkson)

APRICOT

CORYNEUM SPOT (*C. Beijerinckii*) was present in a few orchards in the Okanagan Valley, B.C., but is not an important factor. A considerable amount of leaf spotting caused by arsenical sprays has been attributed by growers to this disease. (H.R. McLarty)

POWDERY MILDEW (*Podosphaera Oxyacanthae*) occurred on several trees in the Laboratory orchard, Summerland, B.C. (G.E. Woolliams)

BLUEBERRY

RED LEAF (*Exobasidium Vaccinii*) A survey of blueberry barrens in Yarmouth Co., N.S. revealed 2-5% infection. The disease is prevalent and destructive in certain clones. (R.M. Lewis)

BOYSENBERRY

LEAF SPOT (Mycosphaerella Rubi) was general on Vancouver Island and the lower mainland, B.C., causing slight to moderate damage. (W. Jones)

CHERRY

BLACK KNOT (Dibotryon morbosum) was general along the lower St. Lawrence, Que., infection being aggravated by the presence of wild hosts. (O. Caron). It was widespread in P.E.I., causing slight to very severe damage. (R.R. Hurst)

LEAF SPOT (Higginsia hiemalis) was general in North Saanich Co., B.C., on wild cherry, Prunus emarginata, providing a possible source of infection for cultivated trees (W. Jones). Leaf spot was serious in southern Ont., especially on sour cherries; one orchard that received no fungicidal spray was defoliated by July 4 and the crop was unsaleable; many orchards were 75% defoliated early in August; properly sprayed orchards were not seriously affected until after the spray schedule had been completed (G.C. Chamberlain). Moderate infection was seen in one locality in P.E.I., but the disease was not generally troublesome. (R.R. Hurst)

POWDERY MILDEW (Podosphaera Oxyacanthae) was widespread in Lincoln Co., Ont., overrunning the vigorous new growth of young trees and causing stunting and leaf distortion, but not causing general damage (G.C. Chamberlain). A specimen was also received from Wallaceburg, Ont. (L.T. Richardson)

BROWN ROT (Sclerotinia fructicola) caused slight damage in a few orchards in the lower mainland, B.C. (W. Jones). It was identified on Compass cherries from Brandon, Man. (L.T. Richardson). Brown rot was found in unsprayed sweet cherries from Annapolis Royal, N.S. (J.F. Hockey). It seriously injured sweet cherries in P.E. I. despite thorough spraying. (R.R. Hurst)

BLOSSOM and TWIG BLIGHT (Sclerotinia laxa Adeh. & Ruhl., and S. fructicola) was common in Vancouver Island and the lower mainland, B.C. "In isolations made from cherry twigs and flower pedicels in four orchards in the Fraser Valley, Sclerotinia laxa only was isolated. No S. fructicola was present. S. fructicola however, was isolated from one sample of Weeping Japanese Cherry."(W. Jones). Blossom blight was prevalent at Saanichton owing, apparently, to the late spring. Sour cherries have proved more susceptible than sweet ones. The removal of sour cherries interplanted with sweet cherries in one orchard has lowered the incidence of disease in the latter (W. Newton). S. fructicola blighted 10-20% of blossoms in several orchards in Lincoln Co., Ont.; in some cases rot of the green fruit occurred where the calyx adhered to it (G.C. Chamberlain). See G.A. Huber and K. Bauer (Phytopath. 31:718-731. 1941) for a discussion of the occurrence of these organisms on the Pacific Coast.

LEAF CURL (Taphrina sp.) severely affected five young trees in one cherry planting in the Okanagan Valley, B.C. (R.E. Fitzpatrick)

NECROTIC LEAF SPOT (?virus) affected 22% of Montmorency sour cherries in four Lincoln Co., Ont., orchards; it causes delayed foliation, necrotic

spotting of leaves, and drop; the trees recover and appear normal by the end of June, except for thin foliage. (R.S. Willison, G.C. Chamberlain)

TATTER LEAF (?virus). No spread found beyond two orchards in which the disease was found in 1941 on Black Tartarian sweet cherries. It has been transmitted by budding to Windsor and Black Tartarian, causing brown spotting and laceration of leaves. Peach, on inoculation, shows a mild mottle late in the season and sometimes a red pin-point spotting. (R.S. Willison)

YELLOWS (?virus). This disease was formerly thought to be physiological, but in 1941 buds from diseased trees were found to transmit it to healthy seedlings. Further transmission experiments are in progress using buds from different orchards. Yellows has been found on Montmorency and Richmond sour cherries in about twenty orchards in Lincoln and Welland counties, Ont. Counts made in nine orchards showed 19-40% of the trees affected. (G.C. Chamberlain)

VIRUS DISEASES in the Okanagan Valley, B.C. No marked changes in the cherry virus situation were seen this year. (T.B. Lott)

CRINKLE (bud sport). No change is observable in the Okanagan Valley, B.C. (T.B. Lott)

FRUIT PITTING (probably frost injury) affected 30-50% of Richmond sour cherries in Lincoln Co., Ont. This variety, which matures earlier than others, was noticeably pitted, with internal breakdown below the skin. The trouble is thought to be due to low temperatures just after setting of the fruit. (G.C. Chamberlain)

GUMMOSIS, apparently following mechanical injury, was seen in one tree in P.E.I. (R.R. Hurst)

HEAT SCALD. Where the picking of sour cherries had not been completed by July 18 in the St. Catharines district, Ont., 50-75% of the crop was lost through severe scalding. Brown rot followed this injury. (G.C. Chamberlain)

NITER BURN. In a 2-year-old orchard of Montmorency sour cherries in Welland Co., Ont., where cyanamid was applied at the rate of ½ lb. per tree, the leaves turned orange-yellow with marginal burning and later dropped. Fifty per cent of the trees were affected. (G.C. Chamberlain)

SPRAY INJURY. Thirty per cent defoliation occurred in one orchard of Montmorency sour cherries in Lincoln Co., Ont., due to copper injury from Bordeaux sprays. Slight injury was evident anywhere in Lincoln and Wentworth counties, where Bordeaux had been used. Fixed copper sprays produced no apparent injury. (G.C. Chamberlain, C.B. Kelly)

YELLOW FOLIAGE, due to wet soil conditions, was general on sweet cherries throughout Lincoln, Welland and Wentworth Counties, Ont., wherever soil drainage was poor. Many trees or branches died later in the season. (C.B. Kelly)

CRANBERRY

LEAF BLIGHT (Naevia Oxycocci). A bog in Kent Co., N.B. that was severely affected in 1941 showed only slight growth and practically no bloom with 100% infection in 1942. As a result the bog has been overrun by sedges and water birch. (S.F. Clarkson)

CURRANT

WHITE PINE BLISTER RUST (Cronartium ribicola). Red currants at L'Assomption, Que., showed 10% infection and black currants 50%. (L.T. Richardson). Blister rust caused early defoliation of black currants on Ile d'Orleans, Que. (C. Perrault). In contrast to 1941, the disease was not common in P.E.I. in 1942. (R.R. Hurst)

SEPTORIA LEAF SPOT (Mycosphaerella Grossulariae) was severe in the University Gardens, Saskatoon, and at Indian Head, Sask. (H.W. Mead). Severe infection caused defoliation of all types of currant at Morden, Man. (W.L. Gordon). This disease was widespread and caused some defoliation of Boskop at Goderich, Ont. (G.C. Chamberlain)

CLUSTER CUP RUST (Puccinia Pringsheimiana) was general on Boskop at Goderich, Ont., causing almost complete defoliation. (G.C. Chamberlain)

POWDERY MILDEW (Sphaerotheca mors-uvae) was recorded on black currants at Cookson and Saskatoon, Sask. (H.W. Mead). There was a moderate infection on all types at Morden, Man. (W.L. Gordon)

REVERSION (virus). Leaves were collected from an unfruitful 7-acre field near Armstrong, B.C. Counts of virus from the central leaf lobes indicated that the trouble was due to reversion. (H.R. McLarty)

GOOSEBERRY

ANTHRACNOSE (Gloeosporium Ribis f. sp. Grossulariae) was general and severe at Morden, Man. (W.L. Gordon)

SEPTORIA LEAF SPOT (Mycosphaerella Grossulariae) was severe at Cookson, Indian Head and Saskatoon, Sask. (H.W. Mead). A slight infection was present at Morden, Man. (W.L. Gordon)

POWDERY MILDEW (Sphaerotheca mors-uvae). In the variety plots at Summerland, B.C., powdery mildew was severe on Poorman, slight on Oregon Champion, and absent from Newton and Pixwell (G.E. Woolliams). A trace of the disease was found in a few gardens in P.E.I., much less than in 1941. (R.R. Hurst)

GRAPE

BLUE MOULD (Penicillium sp.) was severe in imported baskets of grapes received in P.E.I. (R.R. Hurst)

POWDERY MILDEW (Uncinula necator) caused slight damage in a few gardens on Vancouver Island (W. Jones). Mildew was severe in the Experimental Station vineyard, Summerland, B.C., but was absent from vineyards in the Osoyoos area, where it was serious in 1941 (H.R. McLarty). Specimens were received from Brockville, Ont., (L.T. Richardson) and Campbellford. (H. N. Racicot)

LOGANBERRY

SEPTORIA LEAF SPOT (Mycosphaerella Rubi) was general and caused moderate damage on Vancouver Island and the lower mainland, B.C. (W. Jones)

PEACH

BROWN ROT (Sclerotinia fructicola). Brown rot apothecia were abundant in uncultivated orchards at St. Catharines, Ont. In an experimental application of powdered cyanamid, the apothecia were destroyed and no spore discharge was recorded (G.H. Berkeley). Slight blossom and twig blight injury occurred on Elberta in Lincoln Co. (G.C. Chamberlain). The moist season throughout southern Ontario resulted in considerable losses from brown rot. Among the early varieties, Yellow Swan and Rochester were most severely attacked; rain just before and high humidity during the harvest resulted in late infections. Mid-season varieties suffered most in late sections where harvesting took place at the end of August. Rain, heat, and high humidity prevailed again during the Elberta harvest, and much rot developed over night in picked fruit. Less damage resulted where the full spray schedule had been followed, but many growers do not use the complete schedule (R.S. Willison, C.B. Kelly). From a trace to 100% infection occurred in many lots of peaches imported into P.E.I. (R.R. Hurst)

POWDERY MILDEW (Sphaerotheca pannosa) was present in the Okanagan Valley, B.C., but caused little damage (R.E. Fitzpatrick). It was prevalent on Golden Jubilee in Lincoln Co., Ont., but only slightly marked some fruit. (G.C. Chamberlain)

LEAF CURL (Taphrina deformans) was present in the Okanagan Valley, B.C., but caused no significant damage (R.E. Fitzpatrick). There was little or no leaf curl in the Niagara Peninsula despite high humidity during leaf expansion; high temperature hastened leaf development and there was little rain between April 11 and May 3 (R.S. Willison). It was severe on unsprayed trees in Ont. (J.E. Howitt). A few trees at Shediac, N.B. were badly affected. (J.L. Howatt)

WILT (Verticillium sp.). Marked wilting and leaf drop occurred in scattered trees of a 2-year-old Elberta block in Lincoln Co., Ont. The disease was also seen in several other young orchards. Where soil fertility was good the trees made fair recovery (G.C. Chamberlain). One orchard of 2-year-old peach seedlings in the Niagara Peninsula had 60% of the trees infected and 30% killed (C.D. McKeen). C.D. McKeen (Can. Jour. Res. C.21: 95-117, 1943) indicates that the fungus is referable to V. alboatrum; he shows that in the Niagara Peninsula, soil moisture is generally below optimum by the time that soil temperature is high enough to favour the disease.

BACTERIAL BLIGHT (Xanthomonas pruni (E.F. Sm.) Dowson, Zentralbl. f. Bakt. U.S.W. Abt. 2, 100:191. 1939; Pseudomonas pruni E.F. Smith, Science n.s. 17:456. 1903; Starr & Burkh. Phytopath. 32:600. 1942) was of considerable importance in Lincoln Co., Ont., particularly in orchards adjacent to Lake Ontario. An orchard in Louth first showed symptoms about July 3, after the owner had applied three sprays containing zinc sulphate. By mid-August the trees nearest the lake were seriously defoliated and even those furthest from it showed some infection. In 1941 infection did not spread as far from the lake. The disease showed in decreasing severity on Elberta, Golden Jubilee, Vedette and Valiant. Numerous lesions occurred on fruit and young bark. In an orchard in Clinton there was severe damage in the first two or three rows from the lake and very slight infection ten rows back (C.B. Kelly). A similar downward gradation of infection away from the lake was seen in many other Lincoln Co. orchards; this effect is attributed to the added moisture from the lake fogs (C.B. Kelly, G.C. Chamberlain). Several seedlings at the Vineland Station were moderately defoliated by the disease; bacteria were found in spots on the fruit; branch lesions were not numerous (C.B. Kelly). A small orchard of Halehaven on the lakeshore at Beamsville, was seriously infected with fruit spotting and partial defoliation. (C.D. McKeen)

LITTLE PEACH (virus). One hundred and seventy-eight trees in the Niagara Peninsula, Ont., were marked for removal in 1942, compared with 406 in 1941. (C.B. Kelly)

WESTERN X DISEASE (virus). A survey of orchards in the Okanagan Valley, B.C., first mapped in 1940, shows that this disease is increasing in the southern districts; the results of the survey for the last three years are given in the following table:

Southern Districts	1940	1941	1942
Total trees	3,717	3,764	3,348
Diseased trees	67 (total)	41 (new)	28 (new)
% Diseased	1.8 "	1.1 "	0.8 "
Northern Districts			
Total trees	261	259	259
Diseased trees	2 (total)	0 (new)	0 (new)
% Diseased	0.4 "	0 "	0 "
All Districts			
Total trees	3,978	4,023	3,607
Diseased trees	69 (total)	41 (new)	28 (new)
% Diseased	1.7 "	1.0 "	0.8 "

In some diseased trees the symptoms are so slight that they are not readily detected. For example, one tree showed the disease in 1940, failed to show definite symptoms in any of eleven examinations in 1941, and showed the disease again in 1942. In general, symptoms were about as in 1941, but less marked than in 1940 (T.B. Lott). For discussion and illustrations of this and other West Coast diseases, see E.L. Reeves, Virus Diseases of Fruit Trees in Washington, Wash. State Dept. of Agr. Bull. 1, 1943.

X DISEASE (virus). Since the last P.D.S. Report was issued, further data have been received on X disease in the Niagara Peninsula, Ont., in 1941. The disease had evidently been present, but unrecognized, for a considerable time before 1941; for in that year it was found in Clinton, North Grimsby, Niagara, Saltfleet and Stoney Creek, a total of 844 trees being marked for removal in Clinton, Saltfleet and Stoney Creek (C.B. Kelly). Complete figues are not available for Niagara, but 60 diseased trees were found in 6 orchards placed under annual survey and plotting. The outstanding observation from these 6 orchards is the lack of correlation between diseased peaches and proximity to diseased or healthy chokecherry. One orchard, with no chokecherries or other peach trees close to it, had a single diseased tree at its centre. Another had a diseased chokecherry at the N.W. corner, a diseased peach in the centre and a second diseased peach at the S.E. corner. There is evidence of spread from peach to peach and over considerable distances (R.S. Willison, G.C. Chamberlain). In 1941 surveys, a number of orchards were seen with diseased trees that definitely were not within 500 ft. of chokecherries (C.B. Kelly). Most clumps of chokecherry along the highway near Brighton and Port Hope were affected and many dead bushes were seen. (G.C. Chamberlain)

YELLOWS (virus) was about as plentiful in the Niagara Peninsula, Ont., as in 1941, approximately 200 trees being marked for removal. (C.B. Kelly)

PRUNE DWARF (virus) is suspected as the cause of a disease of peach in the Okanagan Valley, B.C. The rate of infection for the district is low, but for a few orchards it is as high as 50%. No more affected prunes have been found. (T.B. Lott)

SPRAY INJURY. Severe injury resulted from the use of arsenical sprays in the Okanagan Valley; however, as they were not widely used, the total damage was slight. It has been noted that persistent use of arsenical sprays causes a cankered condition of the limbs (H.R. McLarty). In Lincoln Co., Ont., shot hole and foliage drop of Rochester resulted from the application of a sulphur and arsenic dust followed by a prolonged wet spell. (G.C. Chamberlain)

INTERNAL BROWNING (cause unknown). Breakdown and internal browning of the flesh around the pit rendered 20% of the crop of an orchard of Veteran in Lincoln Co., Ont., worthless. No manure or fertilizer had been applied for several years, and the fertility level combined with high temperature and humidity during ripening may have been responsible. (R.S. Willison)

WINTER INJURY. A survey of eight peach orchards in various parts of Essex Co., Ont., indicated widespread damage to buds during cold weather in February, 1943. Buds on the lower limbs and on trees with damaged trunks or limbs suffered most injury. The variety Hale appeared to be most seriously affected, all fruit buds in one orchard appearing to be dead. In one large orchard 60% of the buds on Early Elberta and 40% of those on the "V" varieties were killed or severely injured; Late Elberta was much less severely affected. (L.W. Koch)

PEAR

FIRE BLIGHT (*Erwinia amylovora*) broke out in a few orchards in the Okanagan Valley, B.C., but in general it was no more prevalent than usual.

(G.E. Woolliams). Scattered infections were found on Bartlett in 5 orchards in Lincoln Co., Ont. One Kieffer orchard in Lincoln Co. showed infection on 7% of trees with a number of extensive trunk cankers; cultivation of the orchard, with stimulation of growth, may have increased the susceptibility of this relatively resistant variety. (G.C. Chamberlain)

LEAF SPOT (Mycosphaerella sentina) slightly infected Bartlett at Goderich, Ont. (G.C. Chamberlain)

POWDERY MILDEW (Podosphaera leucotricha). Considerable infection occurred on unsprayed trees in the Okanagan Valley, B.C., but spraying for mildew is becoming general and sprayed trees suffered little damage. (R. E. Fitzpatrick)

SCAB (Venturia pyrina) was slight on foliage of Anjou and Clairgeau, and moderate on fruit of Anjou at Sidney, B.C. (W. Jones). It was more prevalent than usual in the Salmon Arm district (G.E. Woolliams). A single Flemish Beauty in a Bartlett block in Lincoln Co., Ont. had many extensive lesions on 2- and 3-year-old wood (G.C. Chamberlain). Owing to the dry season little scab developed at Ste. Anne de la Pocatiere, Que. (C. Perrault). In P.E.I. the disease was moderate to severe on Flemish Beauty and slight to severe on other varieties. (R.R. Hurst)

STONY PIT (virus) was present in approximately 40% of Bosc and 12% of Anjou at the Sidney Station, B.C. In Bosc the foliage was harsh and rolled. (W. Jones)

BLACK END (cause unknown) was present to some extent in most plantings in the Okanagan Valley, B.C. (R.E. Fitzpatrick)

PLUM

SCAB (Cladosporium carpophilum). One specimen was received from Dorchester Co., Que. (H.N. Racicot)

SHOT HOLE (Cercospora circumscissa) was severe on Opata and some other plums at Brandon, Man. This is the first record of this fungus in Man. (W.L. Gordon)

LEAF SPOT (Cylindrosporium Pruni) was severe in one orchard in Lincoln Co., Ont., causing defoliation of German Prune. (G.C. Chamberlain)

BLACK KNOT (Diboeryon morbosum) was prevalent on unsprayed trees in Ont. (J.E. Howitt). It was general in the lower St. Lawrence valley (O.Caron), and in P.E.I. (R.R. Hurst)

SHOT HOLE (Higginsia prunophorae) was reported from St. Hubert Mission, Sask. (L.T. Richardson). It was more severe than usual at Saskatoon. (T.C. Vanterpool)

PHYLLOSTICTA LEAF SPOT (Phyllosticta circumcissa)was very severe on some trees at Morden, Man. (W.L. Gordon)

BROWN ROT (Sclerotinia fructicola) caused very slight damage on a few trees at the Station, Sidney, B.C. (W. Jones). It caused considerable drop at Webb, Sask. (T.C. Vanterpool). Trials in the laboratory orchard, St. Catharines, Ont. gave the following results:

Variety	Rate of Infection	
	Unsprayed	Sprayed
Lombard	16%	1-4%
Imperial Gage	12	4-7
Monarch	15	1-6
Reine Claude	9	5-6
Yellow Egg	18	2-5
Imperial Epineuse	11	3-5
German Prune	17	2-4
Italian Prune	10	0-3

(G.C. Chamberlain)

Brown rot destroyed the complete crop of three trees at Sturgeon Falls, Ont.; a specimen was also received from Dorchester Co., Que. (H.N. Racicot). It was common in unsprayed orchards in Que. (O. Caron). Up to 5% of plums in stores at Fredericton, N.B. were affected (S.F. Clarkson). The disease was prevalent in P.E.I., but less serious than in 1941; careful control measures gave smaller losses in the main orchards. (R.R. Hurst)

BLOSSOM and TWIG BLIGHT (Sclerotinia laxa). At the Station, Sidney, B.C., this trouble was very severe on Shropshire Damson; severe on Michelson, Peach, English Damson, Grand Duke, Date Prune; slight on Santa Rosa, Maynard, Early Gold. Isolations from twigs and pedicels of Reine Claude, Gold and Opata, moderately damaged in Sardis and Vancouver nurseries, also yielded this species. (W. Jones)

PLUM POCKET (Taphrina communis) was reported from Dahinda, and destroyed the entire crop of a block of 13 trees at Weyburn, Sask. (T.C. Vanterpool). The disease was also reported from Saskatoon and Marquis (R.J. Ledingham). Infection was moderate at Brandon, and severe at Morden and Winnipeg, Man. (W.L. Gordon). It was injurious in the Ottawa valley, Que. (O. Caron). A moderate infection occurred in a few trees at Riviere du Loup (C. Perrault), and moderate to severe infection was recorded from Prince Co., P.E.I. (R.R. Hurst)

PRUNE DWARF (Prunus virus 6) has been found in 4 orchards in Ont., no new ones having been added this year. In all these orchards it has occurred on Italian Prune top-worked on Damson. Some plums appear to be immune; the use of these as intermediate stocks is being investigated. (R.S. Willison)

SHIRO LINE-PATTERN MOSAIC (virus). No new cases were observed in commercial orchards in Ont. Inoculated Reine Claude and Italian Prune showed mild oak leaf patterns for the second year in succession; Early Golden and certain Myrobolan seedlings were symptomless; other Myrobolan seedlings showed striking white vein-banding. (R.S. Willison)

LITTLE PLUM (Little peach virus). Eight trees were marked for removal in the Niagara Peninsula, Ont., compared with 39 in 1941 (C.B. Kelly). This is the first report of the little peach virus on plum in the Survey. (I.L. Conners)

VARIEGATION (?virus). In 1941 an Italian Prune tree in Lincoln Co., Ont., partly top-worked with apricot, had a number of variegated leaves. Prune buds from this tree were inserted in a single peach tree in August, 1941. In May, 1942, the inoculated branch, and a strip of bark below it to ground level or lower, died; some early leaves were mottled and ring-spotted; later foliage was more nearly normal, but the fruit was flattened and distorted. This trouble looks like another virus disease, evidently masked in apricot. It was included in the 1942 host range trials. (R.S. Willison)

LEAF SPOT (cause unknown). A severe spotting has been noted for the past two years on leaves of prune in certain districts in the Okanagan Valley, B.C. (R.E. Fitzpatrick)

RUSSETTING (cause unknown) marred much of the fruit in Lincoln Co., Ont.; Yellow Egg (5-50% fruit affected) and Imperial Epineuse (8-50% affected) suffered most; possibly associated with mechanical abrasions (G.C. Chamberlain). Plums received from Bolton Centre, Que., showed corky, raised, pin-point spots of unknown origin; perhaps associated with cool, wet weather early in the season. (H.N. Racicot)

SPRAY INJURY. Shot-holing and considerable leaf-drop were noted on Burbank in Lincoln Co., Ont., following sprays of Bordeaux mixture. (G.C. Chamberlain)

QUINCE

LEAF BLIGHT (Fabraea maculata) caused moderate damage to a few trees at Agassiz, B.C. (W. Jones)

RUST (Gymnosporangium clavipes). Fruit bearing aecia were received from Simcoe, Ont. (J.D. MacLachlan)

RASPBERRY

CROWN GALL (Agrobacterium tumefaciens; c.f. p. 27). Twelve cases were reported in P.E.I. on Viking and other varieties. (R.R. Hurst)

BLIGHT (Botrytis cinerea). This fungus was found fruiting freely on the turions of the seedling O 276 at Truro, N.S., associated with symptoms resembling cane blight. (J.F. Hockey)

SPUR BLIGHT (Didymella applanata). A slight infection occurred on several varieties at Lacombe, Alta. (M.W. Cormack). Spur blight caused very severe damage to canes in a garden in Saskatoon, Sask. (T.C. Vanterpool). It caused moderate damage at Pontrilas (R.C. Russell). Canes in Winnipeg, Man. showed moderate infection (W.L. Gordon). A 2% infection was recorded on Starlight at St. Norbert, and 5% on Chief at Winnipeg (J.W. Scannell). Forty per cent of the canes were affected in a planting at Arkona, Ont., extensive cane

lesions occurring about the lower buds; the rows had been allowed to become thick and weedy (G.C. Chamberlain). Severely affected canes were received from Warren (H.N. Racicot). More than 50% of the canes were seen to be affected in some Ont. plantings (J.E. Howitt). Spur blight was prevalent in a few commercial plantings on Ile d'Orleans, Que., and killed a number of young canes (C. Perrault). A few canes from a planting at Digby, N.S. were blighted (H.N. Racicot). The disease was common in many small plantings in P.E.I. and was serious in one commercial (plantation. (R.R. Hurst)

ANTHRACNOSE (Elsinoe veneta). A specimen was received from Wynyard, Sask. (R.C. Russell). The disease caused from slight to severe damage on black raspberries at Morden, Man. (W.L. Gordon). In Lincoln, Wentworth, and Huron counties, Ont., anthracnose was general and heavy on Nancy and Taylor, though the damage was slight (G.C. Chamberlain). It was scattered in Que. (O. Caron)

CANE BLIGHT (Leptosphaeria Coniothyrium) was found in a planting at Edmonton, Alta. (M.W. Cormack). This disease was widespread in Man., causing considerable losses, especially in central and northern areas (W.L. Gordon). Ten per cent of the canes in a large planting at Steinbach, Man. were infected (J.W. Scannell). It caused the death of many canes on Ile d'Orleans, Que. (C. Perrault)

YELLOW RUST (Phragmidium Rubi-idaei) was general on susceptible varieties in Vancouver Island and the lower mainland, B.C.; aecia were seen on leaves in N.Saanich on April 25. (W. Jones)

LATE RUST (Pucciniastrum americanum). At Morden, Man., leaf infection was general; on Viking, fruit infection also occurred (W.L. Gordon). This rust was general on Viking at Barton, Ont., causing premature defoliation; damage was slight because it occurred late in the season (G.C. Chamberlain). In York Co., N.B., aecia were seen on white spruce on June 4; by late July it was very heavy, especially on Viking and in the plantation closest to the rusted spruce (S.F. Clarkson). The entire crop of a large Viking plantation at Southport, P.E.I. was destroyed by late rust, and other plantations in P.E.I. were seriously affected. (R.R. Hurst)

LEAF SPOT (Septoria Rubi) was general on Washington at Agassiz, B.C., and also occurred on Cuthbert; it damaged R. spectabilis severely and R. parviflorus slightly to moderately in the lower mainland (W. Jones). A light infection occurred at Prince Albert, Sask. (R.C. Russell). In Man. the disease was widespread and heavy; lesions often occurred on bark as well as leaves (W.L. Gordon, J.W. Scannell). Leaf spot was general but of little importance in the Niagara Peninsula and Western Ont. (G.C. Chamberlain), It caused slight to moderate damage on the common varieties in York Co., N.B. (S.F. Clarkson)

POWDERY MILDEW (Sphaerotheca Humuli) was general in a few rows of Latham at Gordon Head, Vancouver Island, but absent from adjacent Lloyd George; Latham seems to be the only susceptible commercial variety in B.C. at present (W. Jones). An entire planting was attacked at St. Lina, Alta. (M.W. Cormack). Slight injury was caused to young leaves in a garden at Prince Albert, Sask. (R.C. Russell, P.M. Simmonds). At Morden, Man., Ottawa 275 was severely affected; it is distinctly susceptible (W.L. Gordon). Heavy infec-

tions were seen on Latham in Ont., especially in nursery plantings in wet locations, resulting in stunting and spindly top growth; Latham is extremely susceptible (G.C. Chamberlain). Mildew was serious on Latham in Ile d'Orleans, Que., and slight on varieties in adjacent rows. (C. Perrault)

VERTICILLIUM WILT (V. sp.) killed 5% of young canes of Cuthbert in a nursery planting at Louth, Ont. (G.C. Chamberlain); 5% of the plants of O 272 in variety test plots at L'Assomption, Que. were infected. (L.T. Richardson)

LEAF CURL (virus). A moderate infection was seen in a garden at Pontrilas, Sask. (R.C. Russell). Leaf curl was prevalent throughout Manitoba (J.W. Scannell). A 2% infection in a Cuthbert plantation in Welland Co., Ont. caused severe stunting (G.C. Chamberlain). Leaf curl (Rubus virus 3A) was common on wild black raspberry in York Co., N.B. (D.J. MacLeod)

MOSAIC (virus). Moderate infection occurred in a garden at Prince Albert, Sask. (P.M. Simmonds, R.C. Russell). Mosaic was slight on some varieties at Morden, Man. (W.L. Gordon), and was widespread but not severe in the province (J.W. Scannell). Ten per cent of plants in a Cuthbert plantation in Welland Co., Ont. were infected (G.C. Chamberlain). Mosaic was general in Que. (O. Caron). Three per cent of Viking and 15% of Latham in a plantation in Sunbury Co., N.B. were diseased, and mosaic was common on wild red raspberries in York, Sunbury, Carleton, Victoria, Kings and Westmorland counties. A well-defined yellow mosaic (Rubus viruses 1 & 2) was common on wild black raspberry in York and Sunbury counties (D.J. MacLeod). At the Station, Kentville, N.S., 1 out of 249 plants of Taylor, 2 out of 527 plants of Viking, and 10 out of 223 plants of O 275 were rogued for mosaic; no affected plants were found in the other varieties (J.F. Hockey). Occasional plants were found in the larger plantings in P.E.I., but from traces to 100% infected plants were found in small gardens. (R.R. Hurst)

YELLOW BLOTCH CURL (virus) increased in amount since 1941 in a Cuthbert plantation at Arkona, Ont., 12% of the plants being affected. (G.C. Chamberlain)

WINTER INJURY seriously affected Viking in commercial and garden plantings in P.E.I. (R.R. Hurst)

SAND CHERRY

SHOT HOLE (Cercospora circumscissa). Sioux variety was severely infected at Brandon, Man. This is the first record on sand cherry in Man. (W.L. Gordon). See entry under plum.

POWDERY MILDEW (Podosphaera Oxyacanthae). A trace to light infection was found in plantings at Glenevis and Three Hills, Alta. (M.W. Cormack)

BROWN ROT (Sclerotinia fructicola). Abundant sporulation was seen at the base of affected spurs on June 17 at Morden, Man. (W.A.F. Hagborg)

LEAF & TWIG BLIGHT & POCKETS (Taphrina mirabilis (Atk.) Gies.) (det. W.W. Ray) caused blighting and loss of crop from a bush at Thornloe, Ont. (H.N. Racicot)

STRAWBERRY

GREY MOULD (Botrytis cinerea). A moderate infection occurred in one P.E.I. planting, severely damaging fruit and attacking some leaves. (R.R. Hurst)

LEAF SPOT (Mycosphaerella Fragariae). At Morden, Man., infection was most severe on Meighen, Horace, Martha, Louise, Claribel, Macdonald, Herman, and New Victoria (W.L. Gordon). At Goderich, Ont. leaf spot was unusually severe on trial varieties from Ottawa (G.C. Chamberlain). Five per cent infection was recorded on sprayed plantings at L'Assomption, Que., with no significant damage (L.T. Richardson). A light infection caused slight damage to Princess and Dunlap at Kentville, N.S. (G.W. Hope). Leaf spot was general in P.E.I. and heavy in some areas. (R.R. Hurst)

FRUIT ROT (Rhizopus sp.) One hundred per cent infection with severe decay occurred in one lot of fruit in Queens Co., P.E.I. (R.R. Hurst)

POWDERY MILDEW (Sphaerotheca Humuli). A 100% infection in Vercheres Co., Que. greatly reduced the crop (E. Lavallee). The disease was seen in several other Que. localities (L.J.S. Laporte). Mildew was heavy in a few localities, but generally light and scattered in Queens Co., P.E.I. (R.R. Hurst)

ROOT ROT (cause unknown) was severe in some plantations in Waterloo and Prince Edward counties, Ont., J.E. Howitt). Seventy-five per cent infection was reported from L'Assomption, Que. (L.T. Richardson)

JUNE YELLOWS (?virus) was severe on Dick, Premier, and Ralph at Kentville, N.S. (J.F. Hockey). It also re-appeared on Dick in P.E.I., the symptoms diminishing as the season advanced. (G.C. Warren)

DROUGHT INJURY. Dry weather during the strawberry season enabled observations to be made, on July 3 and 4, in the test plots at Kentville, N.S. The following varieties showed no wilting and little or no purpling and spotting of foliage: Abbot, Bennett, Bowell, Charles, Chesapeake, Claribel, Clermont, Cooper, Culver, Dick, Florence, Jessie, Macdonald, Nokomis, Perley, Simcoe, Tilley, Walter, Wright, #4734. The following showed little or no wilting and moderate purpling or spotting: Carl, Clare, Herman, Jim, John, Magee, Martha, McKenzie, Meighen, North Star, Pathfinder. The following showed moderate wilting, with varying amounts of purpling or spotting: Borden, Cartier, Cato, Catskill, Dorset, Fresden, Laurier, Lemieux, Louise, Minnehaha, Ralph, Robert, Senator Dunlap, Tupper. The following showed severe wilting, with varying amounts of purpling or spotting: Aroma, Edward, Howe, King, Lavergne, William. (J.F. Hockey)

V. DISEASES OF FOREST AND SHADE TREES

ABIES BALSAMEA - Balsam Fir

Rust (Calyptospora Goeppertiana) was collected July 28, 1941, at Belle River, P.E.I. (R.R. Hurst; det. E.B. Mains)

Witches' Broom (Melampsorella Caryophyllacearum) affected a large tree in L'Islet Co., Que. (J.E. Jacques)

ACER - Maple

Twig Blight (Coryneum septosporioides) was reported from Vesper, Sask. on A. Negundo. (P.M. Simmonds, I.L. Conners)

Tar Spot (Rhytisma acerinum) was widespread in Kamouraska Co., Que. on A. saccharinum (J.E. Jacques). It was general on A. rubrum, A. saccharum and A. spicatum in P.E.I. (R.R. Hurst) R. punctatum was severe on A. spicatum near Hastings, N.B. (J.L. Howatt)

Frost Injury was severe at the Forestry Farm, Saskatoon, Sask. (H.W. Mead). Considerable frost injury was also seen in various locations between Levis and Riviere du Loup, Que. (C. Perrault)

AESCULUS - Horsechestnut

LEAF BLIGHT (Guignardia Aesculi). Infection varied from a trace to heavy at Charlottetown, P.E.I. No trees were found completely free from it. (R.R. Hurst)

Canker (Nectria sp.) was seen on three large trees in P.E.I., probably connected with winter injury. (R.R. Hurst)

ALNUS - Alder

Catkin Deformation (Taphrina Robinsoniana) was very abundant in Kings, Annapolis and Digby counties, N.S. (J.F. Hockey)

AMELANCHIER

Black Leaf Curl (Apiosporina Collinsii) was found on a few bushes at Patricia Bay, B.C. (W. Jones)

Rust (Gymnosporangium sp.) was unusually prevalent at Edmonton and Three Hills, Alta. (M.W. Cormack)

Blight (Sclerotinia Amelanchieris) was severe on blossoms, leaves and young fruits at Edmonton, Alta. (M.W. Cormack)

CORNUS NUTTALLII - Flowering Dogwood

Leaf Blight (Monilia Corni) was general on Vancouver Island, B.C., but caused slight damage. (W. Jones)

CORYLUS - Filbert

Leaf Spot (Gloeosporium Coryli) caused moderate damage at Kentville, N.S. (G,W. Hope)

Leaf Spot (Labrella Coryli Sacc.) did considerable damage to C. rostrata foliage at Brader and Abbotsford, B.C. It caused large spots (about 2 cm. diam.), sometimes coalescing to form large necrotic areas, central area creamy or light brown, outer area rufous brown with irregular, yellowish border; pycnidia, black, many, scattered, amphigenous; spores hyaline, 1-celled 14.5-18 x 4.5-5.5 microns. (W. Jones)

FAGUS GRANDIFOLIA - American Beech

Brown Mould (Gonatorrhodiella Highlei A.L. Smith). J. Ehrlich (Mycologia 34:705, 1942) records the occurrence of G. Highlei associated with Nectria coccinea (Pers ex fr.) Fr. and the woolly beech scale, Cryptococcus fagi (Baer), on diseased beech in affected stands throughout N.S. and in Albert Co., N.B., during the summers of 1930-1932. The determinations were checked by T.T. Ayres (Mycologia 33:178-187. 1941) who recorded the association of this brown mould from Maine. Ehrlich also records its presence at Fredericton on the authority of R.F. Balch, who says, "The brown mold can, I think, be found wherever heavy infestations of the scale occur". A map supplied by Mr. J.J. de Gryse, Chief, Forest Insect Investigations, indicates the distribution of the beech scale: general, old, heavy infestation now covers all N.S. and P.E.I. and South and South-East N.B. in a strip 30 to 50 miles deep; recent heavy infestations cover a further strip 50 miles deep from Newcastle in the North to Maine in the West, taking in Fredericton; light to moderate infestations occur as much as 30 miles further to the North-West. (I.L. Conners)

FRAXINUS - Ash

Leaf Spot (Piggotia Fraxini). Slight to heavy infection occurred on the leaves of a hedge of F. pennsylvanica var. lanceolata at Morden, Man. (W.L. Gordon)

Rust (Puccinia peridermiospora). A moderate infection occurred on F. pennsylvanica at Lyleton, Man. (W.L. Gordon)

Wilt (Verticillium ap.). This fungus was isolated from a diseased tree of F. americana in the Niagara Peninsula; this is believed to be a new host record. (C.D. McKeen)

Frost Injury was severe at the Forestry Farm, Saskatoon Sask. (H.W. Mead)

JUGLANS - Walnut

Bacterial Blight (Xanthomonas juglandis (Pierce) Dowson, Zeitschr. f. Bakt. u.s.w. Abt. 2. 100:190, 1939; Pseudomonas juglandis Pierce, Bot. Gaz. 31:272. 1901; Starr & Burkh. Phytopath. 32:600. 1942) caused moderate foliage injury in Vancouver Island and the lower mainland, B.C. (W. Jones)

JUNIPERUS

Rust (Gymnosporangium clavariiforme) was found on Swedish Juniper at Courtenay, B.C. (W.R. Foster)

Twig Blight (Phoma sp.) caused some damage at Morden, Man., this being a new record for the province. (W.L. Gordon)

LARIX OCCIDENTALIS - Western Larch

Needle Cast (Hypodermella Laricis) was destructive on larches from Grand Forks to Osoyoos, B.C. (Coll. G.E. Woolliams; det. A.W. McCallum)

MORUS - Mulberry

Canker and Die Back (Fusarium lateritium Nees. var. Mori Desm.) was found near New Westminster, B.C. This is the first Canadian record of this fungus. (Coll. W.R. Foster; det. W.L. Gordon)

NUTTALLIA CERASIFORMIS

Leaf Blight (Cylindrosporium Nuttallii) was general at North Saanich and Coquillam, B.C. (W. Jones)

PICEA - Spruce

Rust (Chrysomyxa spp.). The following collections were made in 1941; Chr. Cassandrae on P. glauca, Belle River, P.E.I. (R.R. Hurst); Chr. ledicola on P. Mariana, Belle River, P.E.I. (R.R. Hurst); Chr. Cassandrae with some Chr. ledicola on P. glauca, Charlottetown, P.E.I. (G.W. Ayers). (All det. E.B. Mains). Rust (Chrysomyxa sp.) was widespread, but not heavy on P. pungens in P.E.I. in 1942. (R.R. Hurst)

Deterioration of killed spruce. A paper by C.G. Riley and A.J. Skolko, "Rate of Deterioration in Spruce Killed by the European Spruce Sawfly." Pulp & Paper Mag. of Canada, June, 1942, is the second of three papers on deterioration of killed spruce. The first (Pulp & Paper Mag. of Canada, Aug. 1940) dealt with the rate of decay of spruce killed by the Eastern spruce bark beetle; the third will deal with decay of fire-killed spruce. Sawfly-killed spruce showed a 43.6% loss due to sapwood decay in 6 years, compared with only 3.9% in 6 years for spruce killed by bark-beetles. The difference is explained by the fact that the bark beetles loosen the bark, which is further removed by woodpeckers, and the wood of such trees dries rapidly; whereas the bark of sawfly-killed trees generally remains intact, maintaining a higher moisture content.

PINUS - Pine

Rust (Cronartium ribicola) was observed on occasional white pines in P.E.I. Where pines have been removed, an appreciable reduction of currant rust has been seen. (R.R. Hurst)

Red Leaf (?Abnormal moisture relations). Reddening and premature falling of leaves of 2-leaved pines was severe on 2 trees at Saskatoon, Sask. A similar condition has been ascribed to moisture deficiency (J.H. Faull, Ont. Min. Lands & For. Rept. 1921, 259-260. 1922) and moisture excess (H.T. Güssow, Dept. of Agr. Div. Bot. Rept. 1928, 31-33. 1929). (T.C. Vanterpool)

PLATANUS OCCIDENTALIS - Plane Tree

Leaf and Twig Blight (Gloeosporium nervisequum) was general in a boulevard at Victoria, B.C., causing slight general damage but considerable killing of branches in a few trees; it was also seen on two trees at the Station, Sidney, B.C. (W. Jones) It was quite severe on a tree in the Macoun Memorial Garden, Ottawa, Ont. (Coll. 7923); the typical thin foliage, except at the branch tips, was evident. The disease was present, but much less severe on two trees in the Dominion Arboretum (7917). See also Quercus. (I.L. Conners)

POPULUS - Poplar

Canker (Cytospora chrysosperma) was found on one branch of P. magnifica in Montreal Botanical Garden, Que. (J.E. Jacques)

Blight (Fusicladium radiosum) caused moderate damage at Roblin and Winnipeg, Man. It was particularly destructive to leaves and tips of young trees. (W.A.F. Hagborg)

Leaf Blight (Linospora tetraspora) was general and often severe on P. tacamahaca in central Alta. (M.W. Cormack)

Leaf Spot (Marssonina Castagnei) was so severe on native poplars at Summerland, B.C. that the leaves largely turned brown and shrivelled prematurely. (G.E. Woolliams)

Rust (Melampsora spp.) M. albertensis was general at Summerland, B.C. (G.E. Woolliams). M. Medusae infection was slight to moderate on P. tacamahaca at Edmonton, and severe on one tree at Brooks, Alta. (M.W. Cormack). M. occidentalis was abundant on P. trichocarpa at MacLeod, Alta. (I.L. Conners)

Leaf Spot (Septoria spp.). S. populicola was general and quite severe on P. trichocarpa throughout the Southern interior of B.C. (G.E. Woolliams). S. musiva lightly infected poplars near Calgary, Alta. (M.W. Cormack)

PSEUDOTSUGA TAXIFOLIA - Douglas Fir

Rust (Melampsora albertensis) was abundant near Kootenay, B.C., especially close to the lake. It was also sent in from Kamloops. (H.T. Güssow, J.W. Eastham, W.R. Foster)

Leaf Blight (Rhabdogloeum Pseudotsugae Sydow) was general in the Grand Forks and Osoyoos region, B.C. (G.E. Woolliams). In this material, collected in July, the Rhabdogloeum is fruiting and Rhabdocline past. In material collected in January, the Rhabdocline is immature; in May it is mature. (I.L. Conners)

QUERCUS - Oak

Leaf and Twig Blight (Gloeosporium nervisequum) was found on Q. ?macrocarpa at the mouth of the Jock River, near Ottawa, Ont. (D.C. McIntosh). See also Platanus.

RHAMNUS PURSHIANA - Cascara

Leaf Spot (Phyllosticta Rhamni) was fairly general at Cloverdale, B.C., causing slight damage. (W. Jones)

SALIX - Willow

Canker (Cytospora chrysosperma) caused slight damage at Kentville, N.S. (G.W. Hope)

Rust (Melampsora spp.) was common throughout the Okanagan Valley, B.C. (G.E. Woolliams). A general, slight to severe infection was seen at Edmonton and Fort Saskatchewan, Alta. (M.W. Cormack)

Tar Spot (Rhytisma salicinum) was light at Edmonton, Alta. (M.W. Cormack)

Powdery Mildew (Uncinula Salicis) was common on native willows near Summerland, B.C. (G.E. Woolliams). It was moderately abundant at Edmonton, Alta. (M.W. Cormack)

SAMBUCUS RACEMOSA - Elder

Leaf Spot (Septoria sambucina) was heavy and general at Brandon and Morden, Man. (W.L. Gordon)

SORBUS - Mountain Ash

Fire Blight (Erwinia amylovora) practically killed a large tree (S. ?aucuparia) at Montreal, Que. (J.E. Jacques)

Rust (Gymnosporangium Juniperi) was abundant on trees at Cap à l'Aigle, Que., causing considerable leaf injury. (I.L. Conners)

TILIA AMERICANA - Basswood

Leaf Spot (Cercospora microsora) was light but general at Brandon, and moderate at Morden, Man.; this is a new Manitoba record. (W.L. Gordon)

Leaf Spot (Gloeosporium Tiliae) was heavy on a tree at the Station, Charlottetown, P.E.I. (R.R. Hurst)

ULMUS - Elm

Black Spot (Gnomonia ulmea). A moderate infection occurred on

U. americana at Morden, Man. (W.L. Gordon). It was severe at Morden, causing serious defoliation, and slight at Winnipeg on U. pumila, this being the first Man. record on this host. (W.A.F. Hagborg)

Coral Spot (Nectra cinnabarina) attacked U. pumila severely again at Montreal Botanical Garden, although vigorous pruning has cut down the spread; 2% of the trees had to be removed. The close planting of some trees in hedges has greatly favoured the disease. (J. E. Jacques)

VIBURNUM CASSINOIDES

Rust (Coleosporium Viburni) was common in Sunbury Co.,N.B. (J.L. Howatt)

INSECTS

Empusa sp. was abundant on aphids in potato fields in York, Carleton, Albert, Westmorland and Victoria counties, N.B., greatly reducing the aphid population. (J.L. Howatt)

A few leafhoppers (Empoasca ?fabae) were found infected by Empusa sp. in potato plots at the Station, Fredericton, N.B. (J.L. Howatt)

Empusa sp. caused slight mortality in tarnished plant bugs (Lygus pratensis) in York Co., N.B. (J.L. Howatt)

VI. DISEASES OF ORNAMENTAL PLANTS

ALTHAEA ROSEA - Hollyhock

Leaf Spot (Cercospora althaeina). Infection varied from a trace to heavy on double hollyhocks at Morden, Man., many plants being severely attacked. (W.L. Gordon)

Rust (Puccinia Malvacearum). A moderate, patchy infection occurred at Winnipeg, Man. (A.M. Brown). Infection was general but not heavy at Montreal Botanical Garden. (J.E. Jacques)

Leaf Spot (Septoria malvicola). A moderate, general infection occurred at Brandon, Man. (W.L. Gordon)

AMELANCHIER ALNIFOLIA - Saskatoon

Blight (Diaporthe tuberculosa (Ell.) Sacc.) was severe at Winnipeg, Man., killing entire plants. (W.A.F. Hagborg, I.L. Conners; confirmed by L.E. Wehmeyer)

Leaf Spot (Phyllosticta innumerabilis) was severe at Morden, Man., causing considerable yellowing. (W.L. Gordon)

ANTIRRHINUM MAJUS - Snapdragon

Rust (Puccinia Antirrhini) was general in Vancouver Island and the lower mainland, B.C. but the damage was less than usual in plants grown for seed, owing to dry weather (W. Jones). It was abundant throughout the Okanagan Valley, B.C., in some cases causing considerable injury. (G.E. Woolliams)

Leaf Spot (Septoria Antirrhini) caused spotting and some falling of lower leaves of a few plants at North Saanich, B.C. (W. Jones)

Curly Top (?Beta virus 1). Two plants in the border at the Station, Fredericton, N.B., had thickened, dwarfed and twisted leaves, especially at the ends of branches, and a number of secondary shoots; the plants were dwarfed; the virus was transmitted to healthy snapdragon by grafting. (D.J. MacLeod)

ASTER

Rust (Coleosporium Solidaginis). Several heavily rusted plants of Beechwood Challenger were seen at Morden, Man. (W.L. Gordon)

Powdery Mildew (Erysiphe Cichoracearum). Beechwood Challenger was moderately infected at Morden, Man. (W.L. Gordon)

BEGONIA

Stem Rot (Botrytis cinerea) affected 8% of plants in a greenhouse at St. Catharines, Ont., causing rotting and breaking of the stems, especially near the base. Lack of ventilation, cloudy weather and heavy growth of plants, contributed to its development. (G.C. Chamberlain)

BELAMCANDA CHINENSIS - Blackberry-Lily

Leaf Spot (Heterosporium Iridis) A moderate, general infection was recorded at Brandon, tho first Man. record on this host. (W.L. Gordon)

BERBERIS VULGARIS - Barberry

Rust (Puccinia graminis) caused slight to severe damage in York, Westmorland and Victoria counties, N.B. (S.F. Clarkson, J.L. Howatt). Rust was very heavy on bushes found in Queens Co., P.E.I. (R.R. Hurst)

BOLTONIA

Streak (virus). Fifteen per cent of the plants at the Station, Fredericton, N.B. were affected. See P.D.S. 21:88 (D.J. MacLeod)

CALENDULA

Yellows (Callistephus virus 1) affected 15% of the plants in the border at the Station, Fredericton, N.B. (D.J. MacLeod). It also occurred at Charlottetown, P.E.I. (R.R. Hurst)

CALLISTEPHUS CHINENSIS - China Aster

Rust (Coleosporium Solidaginis). A slight general infection occurred at Winnipeg, Man. (J.E. Machacek)

Wilt (Fusarium oxysporum f. Callistephi) was reported from North Bay, Ont. (L.T. Richardson)

Yellows (Callistephus virus 1) affected a few plants at Edmonton and Lacombe, Alta. (M.W. Cormack). It was common in York, Sunbury and Queens counties, N.B.; 12 healthy plants, 12-18" high, were set out from the greenhouse into a garden; all developed symptoms of yellows about September 15 (D.J. MacLeod). All plants in many gardens in P.E.I. were affected. (R.R. Hurst)

CAMPANULA

Leaf Spot (Ascochyta sp.) was slight on C. glomerata dahurica at Brandon, and severe on some plants of C. macrostyla at Morden, Man. This appears to be the first record of Ascochyta on Campanula in Canada. (W.L. Gordon)

Rust (Coleosporium Campanulae). A fairly heavy infection occurred on Mrs. Harrison's Double Blue near Ottawa, Ont., but none was seen on adjacent plants of other varieties. (D.C. McIntosh, I.L. Conners)

Green Blossom (?virus). A few plants in a garden at Victoria, B.C. had the following symptoms: blossoms were green and did not open normally, the petals adhering to each other; sepals were chlorotic with inrolled margins; the leaves were normal, there was some proliferation of the stems as in aster yellows. (W. Jones)

CARAGANA

Leaf Spot (Septoria Caraganae) was epidemic in central Sask., appearing earlier than usual and causing almost complete defoliation of some hedges by late August; some hedges in Saskatoon show the weakening effects of annual premature defoliation (T.C. Vanterpool). Moderate infections occurred at Brandon, Morden and Winnipeg, Man., with less defoliation than in some years. (W.L. Gordon)

CENTAUREA CYANUS - Cornflower

Leaf Spot (Septoria centaureicola Brun., var. brevispora Pk.) was received from Peterborough, Ont., (I.L. Conners)

CHRYSANTHEMUM

Powdery Mildew (Erysiphe Cichoracearum) was received from Sovereign, Sask. (R.J. Ledingham)

Wilt (?Verticillium sp.). Specimens were received from greenhouses in various parts of Ont. (J.E. Howitt)

Spotted Wilt (Lycopersicum virus 3) caused moderate damage to 20% of the plants in a greenhouse in Sussex Co., N.B. (D.J. MacLeod)

CLEMATIS LIGUSTICIFOLIA

Leaf Spot (Septoria Clematidis). A slight infection occurred at Brandon, Man. (W.L. Gordon)

CONVALLARIA MAJALIS - Lily of the Valley

Leaf Spot (Phyllosticta Convallariae) was prevalent in the Guelph area, and many specimens were received from other parts of Ont. (J.E. Howitt)

COSMOS

Yellows (Callistephus virus 1) occurred at Charlottetown, P.E.I. (R.R. Hurst)

CRATAEGUS

Rust (Gymnosporangium clavariaeforme). A trace to heavy infection occurred in Queens Co., P.E.I. (R.R. Hurst)

CROCUS

Bulb Rot (Botrytis sp.) affected a few plants in one planting at Comox, B.C. (W. Jones)

CYCLAMEN

Stunt (Cladosporium Cyclaminis). About 60% of the plants at the Montreal Botanical Garden were useless for display, and many others bloomed very irregularly, as a result of this disease. (J.E. Jacques)

Leaf Spot (cause unknown) affected odd leaves in the greenhouse at Morden, Man.; Phoma glomerata, Hormodendron cladosporioides and Coniothyrium sp. were recovered. (W.L. Gordon)

DAHLIA

Sclerotinia Rot (S. sclerotiorum). A few plants of Jane Cowl and Golden Dream were badly rotted in storage at the Montreal Botanical Garden. (J.E. Jacques)

Ring Spot (virus). All plants of Satan and Scarlet Pimpernel at the Montreal Botanical Garden were attacked and had to be discarded early. (J.E. Jacques)

Yellows (Callistephus virus 1) was seen at Charlottetown, P.E.I. (R.R. Hurst)

Purple Top (cause unknown) was seen on Jane Cowl, Maude Adams and Treasure Island in Queens Co., P.E.I. (R.R. Hurst)

DELPHINIUM

Bacterial Blight (Pseudomonas delphinii(E.F. Sm.) Stapp in Sorauer, Handb. d. Pflanzenkr. Auf. 5, 2:106. 1928; Bacillus delphinii E.F. Smith, Science N.S. 19:417. 1904; Starr & Burkh. Phytopath. 32:601. 1942) caused moderate damage in a nursery at Oyster River, B.C. (W. Jones)

Mosaic (Cucumus virus 1) affected 1% of the plants in a Fredericton, N.B. garden, causing vein clearing followed by marked mosaic without leaf distortion. (D.J. MacLeod)

DIANTHUS

Leaf Spot (Heterosporium echinulatum). Slight to moderate infection of carnation, D. Caryophyllus, occurred in several greenhouses at Sidney and Victoria, and severe damage was caused in a half-acre field of Sweet

William, D. barbatus, at Keating, B.C. The foliage was cut back and the plants heavily treated with Bordeaux dust; as a result a crop of seed was ensured, although considerable new infection occurred. (W. Jones, W. Newton)

Rust (Uromyces caryophyllinus) caused considerable loss to a Montreal, Que. grower, in spite of repeated sprayings. (J.E. Jacques)

ELAEAGNUS COMMUTATA

Leaf Spot (Septoria Elaeagni (Chev.) Desm.) was found at Morden, Man.; a new record for Canada. (W.L. Gordon, I.L. Conners)

GAILLARDIA

Smut (Entyloma polysporum). A moderate infection occurred on G. aristata at Morden, Man. (W.L. Gordon)

Yellows (Callistephus virus 1) severely affected three plants at the Station, Fredericton, N.B. (D.J. MacLeod). It did severe damage to all varieties at Charlottetown, P.E.I. (R.R. Hurst)

GARDENIA

Canker (Phomopsis Gardeniae). A single old plant at the Montreal Botanical Garden was girdled near soil level (J.E. Jacques)

GERANIUM

Rust (Uromyces Geranii) was collected on G. sp. at St. Andrews, N.B., Sept. 1, 1936. (J. Adams, I.L. Conners)

GLADIOLUS

Yellows (Fusarium oxysporum) attacked odd plants at Brandon and Winnipeg, Man., and near Lake of the Woods, Ont. (W.L. Gordon)

Scab (Pseudomonas marginata (McCull.) Stapp in Sorauer, Handb. f. Pflanzenkr. Auf. 5, 2:56. 1928; Bacterium marginatum McCulloch, Science n.s. 54:115. 1921; Starr & Burkh. Phytopath. 32:601. 1942). A slight infection occurred at Vernon, B.C. (G.E. Woolliams, F.L. Drayton). Slight to moderate infections were seen at Edmonton and Lacombe, Alta. (M.W. Cormack). Scattered plants were destroyed at Brandon and Winnipeg, Man., and near Lake of the Woods, Ont. (W.L. Gordon). Scab was widespread in Ont. with up to 20% of corms affected (J.E. Howitt). A few corms of Rapture were attacked at Montreal Botanical Garden, and traces were seen on a few other varieties. (J.E. Jacques)

Hard Rot (Septoria Gladioli). A few diseased corms, especially of Apricot Glow, were found at Montreal Botanical Garden. (J.E. Jacques)

GODETIA

Rust (Pucciniastrum pustulatum). A moderate infection occurred on Crimson Glow at Morden, Man. (W.L. Gordon)

HELIANTHUS ANNUUS - Sunflower

Rust (Puccinia Helianthi) was very heavy on Sungold at Montreal Botanical Garden - killing some leaves. (J.E. Jacques)

HELICHRYSUM

Yellows (Callistephus virus 1) severely affected 5% of the plants at the Station, Fredericton, N.B. (D.J. MacLeod)

IRIS

Bulb Nematode (Ditylenchus dipsaci). Five per cent infection occurred on Vancouver Island and the lower mainland, B.C. (R.J. Hastings)

Rhizome Rot (Erwinia carotovora) was reported from Toronto, Ont. (L.T. Richardson)

Leaf Spot (Heterosporium Iridis) was slight to heavy in a few plants of bulbous iris on Vancouver Island and the lower mainland, B.C.; it seems to be checked by good soil drainage. (R.J. Hastings). It was general on I. germanica in gardens in the same region, causing considerable foliage damage. (W. Jones). It was general in the Okanagan Valley, B.C., on I. germanica, but did not cause serious damage. (G.E. Woolliams). It was severe at Brooks and moderate at Lacombe, and was common elsewhere in Alta. (M.W. Cormack). A heavy infection occurred in the University gardens, Saskatoon, Sask. (H.W. Mead). A moderate general infection was found at Brandon and a severe infection in the iris border at Morden, Man. (W.L. Gordon). I. germanica was badly disfigured by leaf spot at St. Eustache, and several spotted iris specimens were received from Rawdon, Que. (J.E. Jacques)

Bacterial Leaf Blight (Phytomonas tardicrescens; cf. Starr & Burkh. 32: 603. 1942) attacked Lady Foster (I. germanica) at Montreal Botanical Garden; most of the plants were involved, but in most cases the leaves were only spotted and not blighted; other varieties in the bed were unaffected. (J.E. Jacques)

Rust (Puccinia Iridis) was heavy on I. spuria var. halophila at Montreal Botanical Garden. (J.E. Jacques)

Grey Bulb Rot (Sclerotium Tuliparum). A small amount was found in two plantings at New Westminster and Langley, B.C.; at Abbotsford two areas, each about 20' x 20' of Wedgewood bulbous iris were almost completely destroyed. (R.J. Hastings)

Mosaic (virus). More than 75% of the plants in a large Ontario commercial greenhouse of I. tingitana, var. Wedgewood, from B.C. showed mosaic; the stems were stunted and about 20% of the blooms showed tear-drop symptoms at the time of inspection. (G.H. Berkeley)

LATHYRUS ODORATUS - Sweet Pea

Streak (Erwinia lathyri). Infection was slight to moderate in several Edmonton gardens and moderate to severe at the Station, Lethbridge, Alta. (M.W. Cormack)

Root Rot (Fusarium sp.) A moderate infection was found at Lethbridge, Alta. (M.W. Cormack)

Powdery Mildew (Microsphaera diffusa) was widespread and often heavy in P.E.I. (R.R. Hurst)

Root Rot (Thielaviopsis basicola) caused severe damage in a garden at Saskatoon, Sask. (R.J. Ledingham)

Bud Drop (non-parasitic) was severe in a garden at Saskatoon, Sask. (H.W. Mead). It affected up to 7% of blossoms in gardens examined in P.E.I. (R.R. Hurst)

LIGUSTRUM - Privet

Leaf Spot (Cercosporella sp.) again caused considerable defoliation of a hedge at Milner, B.C. (W. Jones)

LILIUM - Lily

Blight (Botrytis elliptica) caused severe damage at Brooks and was also reported from Medicine Hat and elsewhere in Southern Alta. (M.W. Cormack). It caused severe foliage damage to some plants at Morden, Man. (W.L. Gordon)

LIMONIUM LATIFOLIUM - Sea-Lavender

Rust (Uromyces Armeriae (Schl.) Lév.). Two heavily infected plants were found in August, 1941, in a garden at Brampton, Ont. (G.D. Darker, I.L. Conners).

LINUM PERENNE - Garden Flax

Rust (Melampsora Lini). A light infection was seen at Saskatoon, Sask. (T.C. Vanterpool)

Foot Rot (Phoma sp.) caused plants at Saskatoon to die down prematurely; the organism was isolated from diseased seed and from stem lesions. (T.C. Vanterpool)

LONICERA - Honeysuckle

Blight (Glomerularia Lonicerae). Young shrubs at Ste. Anne de la Pocatière and Rivière du Loup, Que., were seriously affected. (C. Perrault). Blight considerably disfigured bushes in York, Sunbury and St. John Counties, N.B., and caused partial defoliation. (J.L. Howatt). Affected specimens were received from Tusket, N.S., on L. tatarica. (I.L. Conners). C.J. Gould (Phytopath. 33: 4, 1943) describes the conidial, Glomerularia, stage and a basidial stage; basidia from binucleate hyphae protrude through the stomata, become transversely septate and produce four basidiospores; cultures from leaf tissue, conidia and basidiospores produce similar mycelia and conidia in culture but no basidia; infection is readily obtained with basidiospores but not with conidia.

Powdery Mildew (Microsphaera Alni) was moderate and general on L. tatarica at Brandon, and on L. Morrowi and other species at Morden, Man. (W.L. Gordon). Hedges at Montreal Botanical Garden were badly disfigured. (J.E. Jacques)

LUPINUS

Leaf Spot and Blight (Ascochyta sp.) was general along roadsides at Haney and Agassiz, B.C., and in plots at Agassiz, causing considerable foliage damage. (W. Jones)

Streak (Pisum virus 2). Four plants in a York Co., N.B., garden showed stunting and a severe streak on stems and leaves. (D.J. MacLeod)

MALOPE

Foot Rot (?Fusarium oxysporum). 50% of plants at Brandon, Man., were killed by a foot rot; F. oxysporum was isolated. (W.L. Gordon)

MALUS BACCATA

Leaf Spot (?Coniothyrium sp.). A light infection occurred in a hedge at Morden, Man. Coniothyrium sp. was found in some spots. (W.L. Gordon)

MATTHIOLA - Stock

Bacterial Blight (Xanthomonas incanae (Kendr. & Baker) Starr et al. Phytopath 33: 316. 1943; Phytomonas incanae Kendrick & Baker. Univ. Calif. Bull. 665: 11, 1942) was reported on stocks in greenhouses at Dundas and Toronto, Ont., in October and November. (L.T. Richardson, F.L. Drayton)

NARCISSUS

Smoulder (Botrytis narcissicola) killed a few plants in North Saanich, B.C. The disease is becoming less important with the adoption of bulb treatment. (R.J. Hastings)

Eelworms (Ditylenchus dipsaci) were common on Vancouver Island and the lower mainland, B.C., but are becoming less serious due to use of the hot-water treatment. (R.J. Hastings)

White Mould (Ramularia vallisumbrosae) was general on the lower mainland, B.C., but caused negligible damage. (R.J. Hastings)

Leaf Scorch (Stagonospora Curtisii) was serious on the early variety Forerunner, which appears to be highly susceptible, and was general but caused negligible damage on the main commercial varieties. (R.J. Hastings)

Mosaic (virus) infected ½% in the best plantings of King Alfred in Vancouver Island and the lower mainland, B.C., where the growers are roguing. (R.J. Hastings). About 1% infection occurred at Kelowna and Vernon, B.C. (G.E. Woolliams)

NIGELLA - Fennelflower

Foot Rot. 40% of plants at Brandon, Man., were killed. Isolations from the basal parts yielded Fusarium Solani. (W.L. Gordon)

OENOTHERA BIENNIS - Evening Primrose

Rust (Puccinia ludibunda) was seen on a few plants at Vercheres, Que. (J.E. Jacques)

Leaf Spot (Septoria Oenotherae) killed many of the leaves of plants at Vercheres, Que. (J.E. Jacques)

PAEONIA - Peony

Blight (Botrytis Paeoniae) attacked all the buds in one Calgary garden and caused slight damage at Edmonton, Alta. (M.W. Cormack). It was slight on some plants at Morden, Man., but very severe on others. (W.L. Gordon). Blight was prevalent at Guelph, Ont., and many other specimens were received from elsewhere in the province. (J.E. Howitt). Many enquiries about blight were received in P.E.I., where it was serious in clumps with rank growth. (R.R. Hurst)

Leaf Blotch (Cladosporium Paeoniae)was common and caused considerable foliage injury in Vancouver Island and the lower Mainland, B.C. (W. Jones)

Leaf Spot (Septoria Paeoniae) caused moderate damage in two gardens at Sardis and Cloverdale, B.C. (W. Jones)

Mosaic and Leaf Curl (virus). A plant from Charlottetown, P.E.I., showed definite mottling, ringspotting and curling; affected plants are severely dwarfed. The virus is transmitted to healthy peony by grafting, but not by sap inoculation, and is carried over in the roots. The disease may be caused by the ringspot virus combined with a distorting virus. (D.J. MacLeod, R.R. Hurst)

Ring Spot (virus). A trace occurred at Morden, Man. (W.L. Gordon). 3% of the plants at the Station, Fredericton, N.B., showed ring spot, which is slowly spreading. The virus is carried over in the roots. (D.J. MacLeod)

PELARGONIUM - Geranium

Black Shank (?Pythium sp.). 20% of the cuttings in a flat in the greenhouse at Saskatoon, Sask., became diseased; it is thought that they were kept too cool. (T.C. Vanterpool)

Leaf Curl (Pelargonium virus 1). 6% of young plants in a greenhouse in N.S. were affected. (J.F. Hockey)

PETUNIA

Powdery Mildew (Erysiphe ?Cichoracearum) was found in November on a potted plant brought in from outdoors at Ottawa, Ont. The lower leaves were affected and fell off. (C.G. Riley, I.L. Conners)

Leaf Curl (Virus). Two plants in the border at the Station, Fredericton, N.B., showed severe curling and distortion of the leaves, and slight chlorosis of the upper leaves. The disease resembles that caused by Beta virus 1 in other hosts. The virus was transmitted to healthy petunia by grafting but not by sap inoculation. (D.J. MacLeod)

PHLOX

Powdery Mildew (Erysiphe Cichoracearum) caused considerable damage in a garden in the Sumas district, B.C. (W. Jones). It was widespread on the Island of Montreal, Que., often being serious where sulphur dust was not applied. (L.J.S. Laporte). At Montreal Botanical Garden, Sweetheart was particularly severely attacked. (J.E. Jacques). A heavily infected specimen was received from Sydney, N.S. (J.F. Hockey). Powdery mildew caused heavy damage in some P.E.I. gardens; sulphur dust was used on one planting with very good results. (R.R. Hurst)

Leaf Spot (Septoria divaricata) was severe on P. Drummondii at Morden, and moderate on P. paniculata at Brandon, Man. (W.L. Gordon)

Streak (virus). 5% of the plants in the border at the Station, Fredericton, N.B., were affected with streak, which is spreading. See P.D.S., 21:96 (D.J. MacLeod)

Leaf Blight (cause unknown) was found throughout Que., but the damage was not as severe as in 1941. (L.J.S. Laporte). What is apparently the same disease was seen in considerable amounts in P.E.I. (R.R. Hurst)

PRUNUS

Shot Hole (Cylindrosporium prunophorae) was light on P. americana and very heavy on P. nana at Morden, the latter being a new host record for Man. (W.L. Gordon). C. hiemale was moderate on P. pennsylvanica and very heavy on P. Cerasus (sour cherry) in hedges at Morden, the latter being a new Man. record. (W.L. Gordon)

Shot Hole (Phyllosticta circumscissa) was moderate on P. tomentosa at Morden, this being the first record in Man. on this host. (W.L. Gordon)

Shot Hole (cause unknown) was heavy on Siberian Almond on the University campus, Saskatoon, Sask., and caused serious leaf-fall. (T.C. Vanterpool)

Blossom and Twig Blight (Sclerotinia laxa) was isolated from diseased twigs of P. Besseyi and P. triloba in a nursery at Sardis, B.C. (W. Jones)

PYRACANTHA

Scab (Fusicladium Pyracanthae)badly discoloured the fruits in a garden in North Saanich, B.C. reducing their ornamental value. (W. Jones)

RHAMNUS - Buckthorn

Rust (Puccinia coronata) was slight on R. alnifolia in Carleton and Victoria, moderate to heavy on R. cathartica in Westmorland and heavy on R. Frangula in York Co., N.B. (S.F. Clarkson, J.L. Howatt). R. Cathartica was also found rusted in P.E.I. (R.R. Hurst)

Mosaic (virus) affected several bushes in a hedge at Charlottetown, P.E.I.; Aphis abbreviata was abundant. (R.R. Hurst)

RHUS TRILOBATA

Leaf Spot (Phyllosticta rhoina). A slight infection occurred at Morden, the first record in Man. on this host. (W.L. Gordon)

RIBES

Leaf Spot (Septoria spp.). S. aurea was light to moderate on R. odorata var. Crandall at Morden; S. Ribis was reported at Morden, for the first time in Man. on these hosts, as causing almost complete defoliation of R. alpinum, slightly infecting R. diacantha, and severely attacking R. oxycanthoides. (W.L. Gordon)

ROSA - Rose

Black Spot (Diplocarpon Rosae) was recorded at Vulcan and Wetaskiwin, Alta. (M.W. Cormack). It caused premature defoliation of Christopher Stone, Rev. Page-Roberts, Pres. Hoover, General McArthur, McGredy's Sunset, Joanna Hill, Etoile de Holland, Los Angeles, and Karl Druski in the Niagara Peninsula, Ont., where it was widespread. (G.C. Chamberlain). Black spot was prevalent in the Guelph area and defoliated many hybrid tea roses in the test garden at O.A.C. (J.E. Howitt). It was also reported from Woodstock, Ont. (L.T. Richardson). At Montreal Botanical Garden, Que., Else's Rival was heavily infected and lighter attacks occurred on Rouge, Anne Mette Poulson, and Julien Potin. (J.E. Jacques). Slight to severe damage was caused on many varieties at Charlottetown, P.E.I. (R.R. Hurst)

Stem Canker (Leptosphaeria Coniothyrium) killed the new growth of Kirsten Poulson (hybrid polyantha) in Lincoln Co., Ont. (G.C. Chamberlain)

Leaf Spot (Mycosphaerella rosicola) was general on moss rose (R. centifolia var. muscosa) at Patricia Bay, B.C., causing slight damage. (W. Jones). A moderate infection occurred on R. rugosa at Brandon, Man. (W.L. Gordon)

Rust (Phragmidium sp.) was general on both wild and cultivated roses in the Okanagan and Kootenay Valleys, B.C., evidently because of the unusually wet weather. (G.E. Woolliams). A moderate infection of Phr. speciosum occurred at Winnipeg, Man. (A.M. Brown). Phr. disciflorum was received from Amherst, N.S. (I.L. Conners)

Crown Gall (Agrobacterium tumefaciens; see p. 27) Galls were found near the bases of stems of 2-year-old Paul's Scarlet at Kentville, N.S. (J.F. Hockey). Crown gall severely damaged Paul's Scarlet and other climbers in P.E.I. (R.R. Hurst)

Anthracnose (Sphaceloma Rosarum (Pass.) Jenkins) was found to be fairly general at the Station, Agassiz, B.C.; det. by Miss Jenkins, (W. Jones); and it was found on R. spinosissima var. altaica at Morden, Man. (Coll.

W.L. Gordon, det. I.L. Conners). This is the first report in the P.D.S., but Dr. A.E. Jenkins has it from phanerogamic specimens collected in Que. and N.B. (J. Agr. Res. 45:321-337, 1932)

Powdery Mildew (Sphaerotheca spp.). S. Humuli severely defoliated a few plants at Edmonton, Alta. (M.W. Cormack). A trace of S. pannosa was present on Dorothy Perkins at Charlottetown, P.E.I. (R.R. Hurst)

SEMPERVIVUM - Houseleek

Rust (Endophyllum Sempervivi) was found infecting all 10 species of Endophyllum in a nursery at Grimsby, Ont. All diseased plants had abnormally elongated stems, and telia were abundant on the leaves. Control was obtained by the destruction of all diseased plants. (J.D. MacLachlan). Previously reported only from B.C. (P.D.S. 14:86 and 15:68); it is represented in the herbarium by one specimen from Vancouver, 1931, coll. C.W. Armstrong and two specimens from Victoria, 1935, coll. W. Jones.

SYRINGA VULGARIS - Lilac

Leaf Spot (Phyllosticta Syringae) was severe on one shrub at Langley, B.C. (W. Jones)

Mosaic (?virus). 2% of the bushes at the Station, Fredericton, N.B. showed a definite veinal mottle. (D.J. MacLeod)

Chlorosis & Wilt (cause unknown). Two bushes at the Station, Fredericton, N.B., showed progressive chlorosis of the leaf edges and interveinal areas, with reduction in number and size of leaves, brittle and curled leaves, stunting and ultimate death of the plants. It appears to be similar to the graft blight described by K.S. Chester (Jour. Arnold Arboretum 11: 232-233, 1930), as due to lilac-privet incompatibility. The privet root stock continued to grow after the lilac had died. (D.J. MacLeod)

TAGETES PATULA - French Marigold

Yellows (Callistephus virus 1) affected 10% of the plants in the border at the Station, Fredericton, N.B., causing chlorosis, stunting, and a dense cluster of shoots with small leaves and with many flower buds that often failed to open; many diseased plants died down early. (D.J. MacLeod)

Purple Top (undetermined) affected 2% of the plants in the border at the Station, Fredericton, N.B. causing extreme leaf rolling and distortion, dwarfing and vivid purpling; affected plants wilted and died early; the symptoms resembled those described in this report for purple top on tomato. (D.J. MacLeod)

TULIPA - Tulip

Fire (Botrytis Tulipae). Examination of 94 plantings in coastal B.C. revealed a trace in 75%, slight (0.1 to 0.2%) in 15% and severe (0.2 to 0.5%) in 10% of plantings. (R.J. Hastings). Most plantings in the Vernon, B.C. area were free from fire, but two with poor air drainage showed about 10% infection. (G.E. Woolliams). Only traces were found in P.E.I., even in gardens where it was severe in 1941. (R.R. Hurst)

Storage and Bulb Rot (Penicillium sp. & Botrytis Tulipae) was severe in one field in the lower mainland, B.C., owing to storage in a warm attic; the plants were stunted and the bulbs rotted. (R.J. Hastings)

Stem Rot (Sclerotinia sclerotiorum). When a planting of tulips near Victoria, B.C., was inspected May 12, ½% of the plants were found to be infected by what proved to be S. sclerotiorum. The fungus attacked the stem at ground

level and spread up into the leaves, causing large whitish lesions; mycelium and large, white, immature sclerotia were seen near the leaf axils. There was no sign of the disease when the plants were first inspected March 19. The tulips followed alfalfa. This appears to be the first record of this fungus on tulip in Canada, though Prof. H.H. Whetzel is known to have isolated it from tulip in England, and W.C. Moore (Diseases of bulbs. Bull. 117, Brit. Min. Agr. & Fisheries, 1939) mentions that it has been reported on tulip in New Zealand. (R.J. Hastings, F.L. Drayton)

Grey Bulb Rot (Sclerotium Tuliparum) was slight in one New Westminster, B.C., planting; see, however, under Iris. (R.J. Hastings)

Break (virus). Examination showed a trace in 40%, slight infection in 16%, and severe infection in 12% of 24 plantings, in Vancouver Island and the lower mainland, B.C. (R.J. Hastings). Break affected up to 50% of a few plantings in the Okanagan Valley, B.C., but in most the rate was below 1%. (G.E. Woolliams)

VIBURNUM TRILOBUM - High Cranberry

Leaf Spot (Cercospora varia). A moderate infection occurred in a hedge at Morden, particularly on the lower leaves; this is the first record of C. varia on this host in Man. (W.L. Gordon)

VIOLA TRICOLOR - Pansy

Powdery Mildew (Sphaerotheca Humuli). Slight to moderate infections were found in gardens at Edmonton and Lloydminster, Alta. (M.W. Cormack)

ZINNIA

Wilt (Fusarium sp.) was found at Ottawa, Ont., (L.T. Richardson)

Curly Top (? Beta virus 1). 2% of the plants in a nursery at Sussex, N.B., showed veinal mottle, curling and waviness of the leaf blade, and stunting. (D.J. MacLeod)

RHUS TOXICODENDRON

Foot Rot (Fusarium oxysporum associated). At Camp Shilo, Man., a foot rot was found to be causing the complete destruction of poison ivy plants in certain patches; F. oxysporum was isolated (first record on this host in Man.), but its pathogenicity has not yet been tested. (W.A.F. Hagborg, W.L. Gordon). This record is included here as being of probable interest to gardeners and others.

COKE FUMES INJURY TO GREENHOUSE PLANTS

Serious injury was caused in a Victoria, B.C., greenhouse when the furnace door was left open. Damage was rated as follows: (1) no damage - cup of gold; (2) leaf edge discolouration - viola; (3) tip burn - aloe, alternanthera, heliotrope, kentia palm, Monterey cypress; (4) tip burn and spotting - begonia, Boston fern, geranium, ivy geranium, nasturtium; (5) severe tip-burn, spotting, defoliation, with death of many plants - calceolaria, fuchsia; (6) general debility but no serious injury - date palm. (W.R. Foster)

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